# A taxonomic revision of *Mallotus* Lour. (Euphorbiaceae) in Australia

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**Summary**

Forster, Paul I. A taxonomic revision of *Mallotus* Lour. (Euphorbiaceae) in Australia. Austrobaileya 5(3): 457-497 (1999). The genus *Mallotus* is revised for Australia. Thirteen species are recognised; *M. claoxyloides* (F.Muell.) Muell.Arg., *M. discolor* F.Muell. ex Benth., *M. dispersus* P.I.Forst. sp. nov., *M. ficifolius* (Baill.) Pax & K.Hoffm., *M. megadontus* P.I.Forst. stat. et nom. nov. (based on *M. claoxyloides* var. *angustifolia* F.M.Bailey), *M.mollissimus* (Geisel.) Airy Shaw, *M. nesophilus* Muell.Arg., *M. paniculatus* (Lam.) Muell.Arg., *M. philippensis* (Lam.) Muell.Arg., *M. polyadenos* F.Muell., *M. repandus* (Willd.) Muell.Arg., *M. resinosus* (Blanco) Merr. and *M. surculosus* P.I.Forst. sp. nov. All taxa are described and the majority illustrated, with notes on distribution, habitat, typification, conservation status and phenology. Lectotypes are selected for *Croton ricinoides* Pers., *Echinus claoxyloides* var. *cordata* Baill., *E. claoxyloides* var. *ficifolia* Baill., *Mallotus nesophilus* and *M. polyadenos*. An identification key to the species is provided.

Key words: *Mallotus, Mallotus dispersus, Mallotus megadontus, Mallotus surculosus.*

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## Introduction

*Mallotus* Lour. has c. 140 species in Malesia, eastern Asia, tropical Africa, Madagascar, Melanesia and Australia (Mabberley 1989). Species are predominantly perennial shrubs or small trees and more rarely woody lianes. Many taxa occur in rainforest, woodland and open forest communities.

The genus was included in the subtribe Rottlerinae Meisn. of the tribe Acalypheae Dumort. in the subfamily Acalyphoideae Ascherson (Webster 1994). Other genera included in this subtribe by Webster are *Coccoceras* Miq., *Cordemoya* Baill., *Deuteromallotus* Pax & K.Hoffm., *Neotrewia* Pax & K.Hoffm., *Octospermum* Airy Shaw, *Trewia* L. and *Rockinghamia* Airy Shaw. None of these other genera except *Rockinghamia* occur in Australia and are not considered further in this account as there is yet to be a satisfactory phylogeny proposed for the group.

The first published Australian record of a plant now referrable to the genus *Mallotus* s.l. was by F. Mueller (1858) who described *Echinocroton claoxyloides* F.Muell. He later (F. Mueller 1864) recorded *Mallotus* for Australia with comments on *M. zippelii* (Hassk.) F.Muell. (a misapplication) and the description of *M. pycnostachys* F.Muell. (a synonym of *M. mollissimus* (Geisel.) Airy Shaw)). J. Mueller (1866) enumerated three species, including the new species *M. nesophilus* Muell.Arg. Bentham (1873) enumerated nine, of which one (*M. angustifolius* Benth.) has since been transferred to *Rockinghamia* Airy Shaw (Airy Shaw 1966).

The most recent account of the genus for Australia is the conspectus and precursor papers of Airy Shaw (1980a, 1980b, 1981) wherein thirteen species were recognised. Despite these recent accounts, a revision of *Mallotus* in Australia is justified for the following reasons. Three of the 'species' detailed by Airy Shaw do not occur in Australia, namely *M. didymochryseus* Airy Shaw, *M. tiliifolius* (Blume) Muell.Arg. and *M. oblongifolius* (Miq.) Muell.Arg. and are based on misidentifications or changes in taxon circumscription. *Mallotus claoxyloides* (F.Muell.) Muell.Arg. as circumscribed by Airy Shaw, is complex and comprises three species, including one which is new. There are an additional two new species from northern

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Australia. Lastly there is a considerable increase in available distributional data over the last 20 years. Hence the present account also covers thirteen species, but with significant differences to those recognised by Airy Shaw (1981).

The genus *Mallotus* may well be polyphyletic, as there is considerable variation in the taxa referred to it, particularly in leaf arrangement, male floral morphology, fruit ornamentation and some anatomical characters (e.g. Hussin *et al.* 1996). A sectional classification exists to take this variation into account (e.g. J. Mueller 1866; cf. Airy Shaw 1971, 1981), but it requires revision as does the genus as a whole. Both of these are beyond the scope of this work but given the numerical size of *Mallotus* s.l. would constitute a worthwhile project for a monograph.

Some species of Australian *Mallotus* are widespread (e.g. *M. nesophilus* and *M. philippensis*), whereas others are quite restricted (e.g. *M. megadontus*). Greatest diversity of the genus can be found in the Iron Range area of Cape York Peninsula followed by parts of the Wet Tropics and south-east Queensland (Map. 1). These concentrations of species are correlated with wetter rainforest occurring in proximity to other community types thereby creating a mosaic of communities.

Little has been recorded about the species of *Mallotus* and how they interact with associated fauna. Floyd (1989) states that the seeds of *M. discolor* have increased germination if gathered from bird droppings. It can be perhaps assumed that all of the various species are dispersed by birds as the fruits are often brightly coloured and with relatively large seeds. The broad distribution of *M. nesophilus* and *M. philippensis* is a reflection of this vagility in the group. With the possible exceptions of *M. dispersus*, *M. megadontus* and *M. resinosus*, the Australian species could be broadly described as pioneers in the seral stages of rainforest succession.

## Materials and Methods

This revision is based on herbarium collections in AD, BRI, CANB, CBG, DNA, MEL, NSW, PERTH, PR and QRS, photographs or microfiche of selected collections at BM, C, G, K and P and my own observations and field collections of all taxa. All types have been seen unless indicated as n.v.

Foliage measurements and descriptions have been made from dried material. Flower and fruit descriptions have been made from spirit, reconstituted and dried material. Leaf sizes refer to those measured on fertile stems. Some leaves on juvenile plants may exceed the given measurements. Indumentum cover is as defined by Hewson (1988), except that 'scattered' is used instead of 'isolated'. If a hair or gland type is not mentioned when describing a particular organ, it may be assumed to be absent.

The 'Wet Tropics' is defined as that area of north-eastern Queensland that encompasses the 'hot, humid vine forests' from near Cooktown in the north to Paluma in the south (Webb & Tracey 1981, Barlow & Hyland 1988). Rainforest terminology follows Webb (1978).

Conservation coding terminology follows those used in Queensland Government, Nature Conservation Act legislation (1992, 1994).

The account of species is arranged alphabetically and does not reflect phylogeny.

## Taxonomy

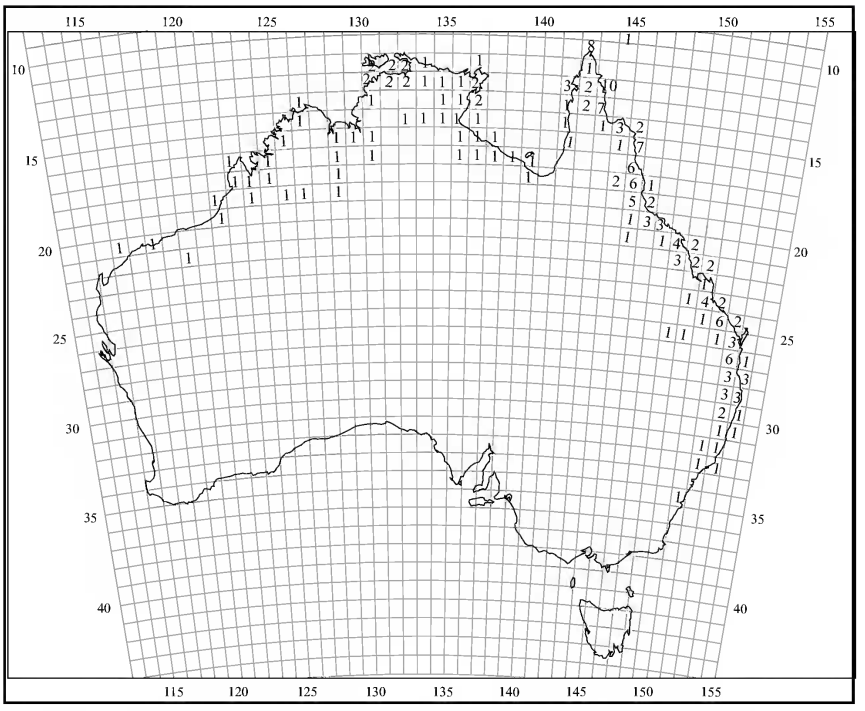
**Mallotus** Lour., Fl. Cochinch. 601, 635 (1790).
**Type:** *Mallotus cochinchinensis* Lour.

*Echinus* Lour., Fl. Cochinch. 601, 633 (1790).
**Type:** *Echinus trisulcus* Lour.

*Rottlera* Roxb., Pl. Coromandel 2 (1802).
**Type:** *Rottlera tinctoria* Roxb.

*Echinocroton* F.Muell., Fragm. 1: 31 (1858).
**Type:** *Echinocroton claoxyloides* F.Muell.

Small trees, shrubs or lianes, evergreen or deciduous, monoecious or dioecious, perennial. Indumentum of simple, biseriate or stellate hairs and sessile coloured glands. Leaves opposite or alternate, petiolate, stipulate; lamina lobate or elobate, palminerved or penninerved; margins entire, sinuate or dentate; foliar glands




**Map 1.** Distribution of ***Mallotus*** in Australia indicating the number of taxa in each 1° grid square.

on upper surface;granular inclusions sometimes present. Inflorescence generally unisexual, spicate, racemose or paniculate, terminal or axillary; male flowers in 1-many flowered bracteate fascicles; female flowers in 1(rarely 2) flowered bracteate fascicles. Male flowers: calyx globose in bud, valvate, 2–4-lobed; petals absent; disk glands absent or present; stamens numerous, filaments free or fused, anthers subdorsifixed, longitudinally dehiscent. Female flowers: calyx ovoid-globose in bud, imbricate to valvate, 2–4-lobed; petals absent; disk glands absent; ovary 2–4-locular, with 1 ovule per locule; styles ±free or connate for varing lengths, simple, generally recurved, papillose or plumose, often with indumentum on backs. Fruit globose to depressed globose, generally strongly angled, smooth or echinate, dehiscing septicidally into bivalved cocci leaving a persisent columella; endocarp crustaceous. Seeds globose to ovoid, ecarunculate; cotyledons broad, flat.

A genus of c. 140 species, widespread in the Old World tropics and subtropics. Thirteen species in Australia.

## Key to the Australian species of *Mallotus*

1. Leaves alternate ..... 2
   Leaves opposite ..... 8

2. Leaves peltate ..... 3
   Leaves not peltate ..... 4

3. Plants evergreen; leaves white-silver below, 4-veined from base ..... **6. M. mollissimus**
   Plants deciduous; leaves green below, 6-8-veined from base ..... **13. M. surculosus**

4. Scandent woody lianes ..... **11. M. repandus**
   Shrubs or trees ..... 5

5. Coloured sessile glands not visible or absent from lower leaf surface, indumentum obscuring lower leaf surface ..... **8. M. paniculatus**
Coloured sessile glands on lower leaf surface, indumentum not obscuring lower leaf surface ..... 6

6. Red sessile glands on lower leaf surface ..... **9. M. philippensis**
Yellow sessile glands on lower leaf surface ..... 7

7. Interlateral veins poorly developed below; stamens 24–38 per flower; fruit with yellow to yellow-orange sessile glands ..... **2. M. discolor**
Interlateral veins strongly developed below; stamens 50–60 per flower; fruit with orange sessile glands ..... **7. M. nesophilus**

8. Leaf lamina with granular inclusions above ..... **10. M. polyadenos**
Leaf lamina without granular inclusions above ..... 9

9. Leaf lamina palminerved ..... **3. M. dispersus**
Leaf lamina penninerved ..... 10

10. Leaf lamina without coloured sessile glands below ..... **5. M. megadontus**
Leaf lamina with coloured sessile glands below ..... 11

11. Stems rounded near apices ..... **12. M. resinosus**
Stems flattened near apices ..... 12

12. Stems, leaves and inflorescences with clear stellate hairs when young; leaf lamina margins sinuate, rarely weakly dentate; male flower pedicels thick (0.8–1 mm diameter); male calyx lobes lanceolate to lanceolate-ovate; stamens 46–48 ..... **1. M. claoxyloides**
Stems, leaves and inflorescences with yellow stellate hairs when young; leaf lamina margins strongly dentate with teeth 2–7 mm long; male flower pedicels filiform (0.2–0.3 mm diameter); male calyx lobes obovate; stamens 28–42 ..... **4. M. ficifolius**

**1. Mallotus claoxyloides** (F.Muell.) Muell.Arg., Linnaea 34: 192 (1865); *Echinocroton claoxyloides* F.Muell., Fragm. 1: 32 (1858); *Echinus claoxyloides* (F.Muell.) Baill., Adansonia 6: 315 (1866). **Type:** Queensland. Moreton District: Brisbane River, [*Hill & Mueller*] [MEL708383] (holo: MEL).

*Echinus claoxyloides* var. *cordata* Baill., Adansonia 6: 315 (1866); *Mallotus claoxyloides* var. *cordatus* (Baill.) Airy Shaw, Muelleria 4: 232 (1980). **Type:** New South Wales. Richmond River [*Beckler*] [MEL515956] (lecto [here designated]: MEL).

*Mallotus claoxyloides* var. *glabratus* Domin, Biblioth. Bot. 28: 888 [334] (1928). **Type:** Queensland. South Kennedy District: Port Mackay, 1863-1865, *A. Dietrich* 524 (holo: PR; iso: CANB, MEL).

***Illustrations*:** Williams (1984: 189, 1987: 197); Floyd (1989: 151); Hauser (1992: 264).

Shrub or small tree to 5 m high; evergreen, perennial, dioecious. Stems ± flattened towards apices, with dense, clear stellate hairs when young, glabrescent and lenticellate with age. Stipules linear-lanceolate, 1.7–7 mm long, 0.3–1 mm wide, with sparse, clear stellate hairs. Leaves opposite, not peltate, petiolate, discolorous; petioles 4–23 mm long, 0.6–0.7 mm

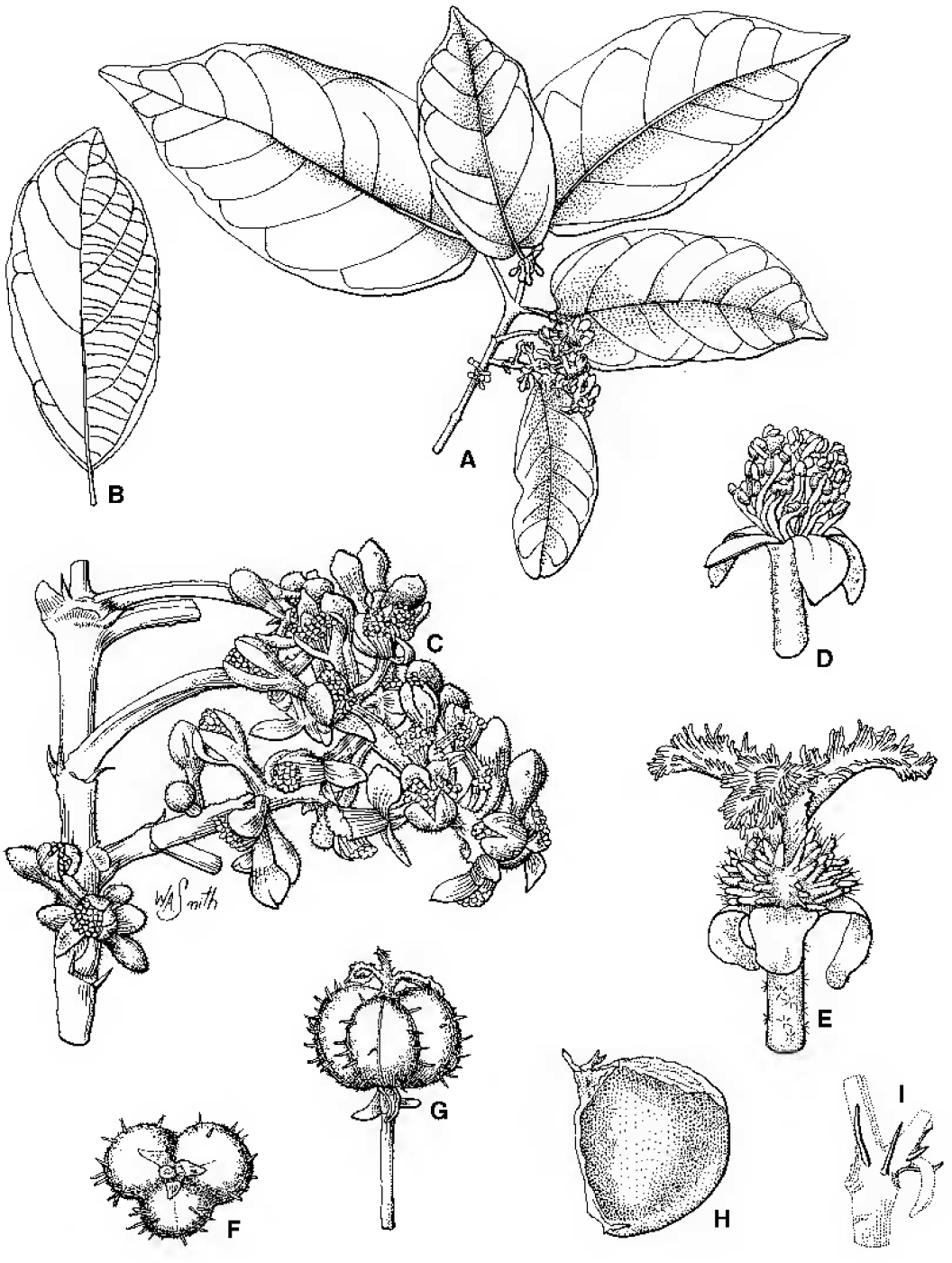



**Fig. 1.** ***Mallotus claoxyloides***. A. flowering twig. x 0.5. B. undersurface of leaf. x 0.5. C. twig with several inflorescences of male flowers. x 2. D. male flower. x 5. E. female flower. x 5. F & G. fruit. x 2. H. seed. x 4. I. internode with stipules emphasized. x 2. A-D from *Forster* 2744 (BRI); E from *Forster* 12437 (BRI); F & G from *Forster* 520 (BRI); H & I from *White* 8697 (BRI). Del. W.Smith.

diameter, with scattered to sparse, clear stellate hairs; basilaminar glands 1 per side of midrib towards lamina base, ellipsoid, 0.5–1 mm long, 0.4–0.6 mm wide; lamina elliptic, oblong or obovate, 35–170 mm long, 20–80 mm wide; penninerved, comprising 6–9 lateral veins per side of midrib and reticulate interlateral veins; upper surface ±glossy mid-green, lateral veins visible, interlateral veins not visible, without granular inclusions, with scattered to sparse, clear stellate hairs, glabrescent; lower surface pale green, lateral and interlateral venation well developed, with dense, clear stellate hairs and scattered, yellow sessile glands, becoming glabrescent with age; tip acute, acuminate or rounded; base cordate or rounded; margins sinuate or weakly dentate with 8–15 teeth up to 4 mm long, strongly toothed on juvenile foliage. Inflorescences racemose, up to 25 mm long, with sparse, clear stellate hairs; bracts lanceolate, 1–2 mm long, 0.5–1 mm wide, with scattered to sparse, clear stellate hairs. Male flowers 2–5 per bract; pedicels 1–4 mm long, 0.2–0.3 mm diameter, glabrous or with scattered to sparse, clear stellate hairs; calyx 3-lobed, lobes lanceolate to lanceolate-ovate, 3-5 mm long, 1.5–3 mm long, with sparse, clear stellate hairs; disk glands absent; stamens 46–48, free; filaments filiform, 1.5–4 mm long, 0.1–0.2 mm diameter, glabrous; anthers oblong, 0.4–0.5 mm long, 0.4–0.5 mm wide, glandular cap absent. Female flowers 1 or 2 per bract; pedicels 6–25 mm long, 0.5–1 mm diameter, with sparse, clear stellate hairs; calyx 3-lobed, lobes lanceolate, 2.5–4 mm long, 1–2 mm wide, with sparse, clear stellate hairs and scattered yellow sessile glands; ovary 3-locular, subglobose, 2–2.5 mm long, 2.5–4 mm diameter, with scattered, clear stellate hairs and simple echinate processes to 1 mm long that have a few clear stellate hairs; styles 3, 3–7 mm long, connate at base for c. 1 mm, plumose with sparse, clear stellate hairs on backs. Fruits subglobose, 6–8 mm long, 11–13 mm diameter, with scattered, clear stellate hairs and simple, echinate processes to 1 mm long with scattered, clear stellate hairs. Seeds ovoid, 5–5.5 mm long, 4.5–5 mm wide, 4–4.5 mm thick, smooth, brown. *Odour bush, Green kamala, Smell of the bush.* Fig. 1.

***Selected additional specimens*: Queensland.** Cook District: Muddy Bay, Cape York, 10°43'S, 142°33'E, Jun 1994, *Forster* PIF15327 & *Tucker* (BRI, QRS); Hill 334, Pascoe River, 12°52'S, 143°01'E, Jun 1994, *Forster* PIF15386 & *Tucker* (BRI, MEL, QRS); Kalpowar Holding, 17°25'S, 144°20'E, Sep 1970, *Hyland* 4795 (BRI, QRS). South Kennedy District: St Bees Island, Turtle Bay, 36 km NE of Mackay, 20°55'S, 149°27'E, Mar 1989, *Batianoff* 11019 (AD, BRI). Leichhardt District: Boomer Range, 23°13'S, 149°46'E, Feb 1993, *Fensham* 699 (BRI). Port Curtis District: 2.5 km SW of Raglan, R146, Horrigan Creek, 23°43'S, 150°48'E, Mar 1989, *Gibson* TOI486 (BRI). Burnett District: Mt Blandy, 25°24'S, 151°45'E, Dec 1980, *Forster* PIF520 (BRI); Kalliwa Creek, S.F. 169 St Agnes, 25°19'S, 151°51'E, Dec 1990, *Forster* PIF7718 (BRI, K, L, MEL, MO, NSW, QRS); Cannindah, c. 20 km NE of Monto, May 1975, *Romano* [AQ203712] (BRI). Wide Bay District: Mt Woowonga, S.F. 287, 25°26'S, 152°06'E, Oct 1990, *Forster* PIF7538 (BRI, K, L, MEL, QRS); S.F. 82 Brooyar, Dry L.A., 26°11'S, 152°28'E, Dec 1991, *Forster* PIF9262 & *Tucker* (BRI, K, L, MEL, QRS); NW slopes of Mt Glastonbury, 26°14'S, 152°27'E, Dec 1991, *Forster* PIF9309 & *Sharpe* (BRI, K, L, MEL, QRS); road from Wallaville to Mingo Crossing, c. 4 miles [6.7 km] SW of Wallaville, 25°06'S, 151°48'E, Jan 1970, *Lebler* 11 & *Durrington* (BRI, CANB); Tinana Creek, 7 km ENE of Tiaro, 25°42'S, 152°39'E, Jan 1992, *Smyrell* [AQ541631] (BRI). Moreton District: Two Tree Hill, 3 km SW of Marburg, 27°35'S, 152°33'E, Jan 1993, *Bird* [AQ563800] (BRI, L, MEL, QRS); 6 km W of Woombye, 26°38'S, 152°53'E, Dec 1992, *Forster* PIF12436 & *Sharpe* (BRI, MEL, QRS); Upper Brookfield, Brisbane, Feb 1978, *Jessup* 45 (BRI); Mt Eerwah, 4 km W of Eumundi, 26°29'S, 152°55'E, Jan 1985, *Sharpe* 3681 (BRI). **New South Wales.** Wilson Park, Lismore, 28°49'S, 153°16'E, Jul 1981, *Harden* 81269 & *Williams* (BRI); Toonumbar, near Kyogle, Mar 1944, *White* 12570 (BRI).

***Distribution and habitat*:** *Mallotus claoxyloides* is widespread in subcoastal areas with a more or less continuous distribution from north-east New South Wales to the South Kennedy district of Queensland and with a couple of disjunct occurrences in Cook district (Map 3). This species is also reported for southern New Guinea (Airy Shaw 1980c).

*Mallotus claoxyloides* is a common plant on the edges of semi-evergreen vinethicket, araucarian microphyll and notophyll vineforests on a variety of substrates and is common along creeks. The foliage may emit a distinctive 'scrub' scent that is noticeable to some people in proximity to the plants.

***Phenology*:** Flowers from October to April; fruits from November to May.

***Notes*:** Airy Shaw (1981) included *Mallotus claoxyloides* var. *macrophylla* in the synonymy of *Mallotus claoxyloides* var. *cordatus*. In the present account *Mallotus claoxyloides* var. *macrophylla* is included in the synonymy of *M. ficifolius* and *M. claoxyloides* var. *cordatus* is included in the synonymy of *M. claoxyloides*. I believe it unlikely that Airy Shaw saw many of the syntypes of *Echinus claoxyloides* var. *cordatus*, otherwise he would not have considered it and *M. claoxyloides* var. *macrophylla* as the same. All of the syntypes that I have seen of *M. claoxyloides* var. *cordatus* are conspecific with the type of the name *Echinocroton claoxyloides* and a lectotype is designated here from the Richmond River specimen.

***Conservation status*:** *Mallotus claoxyloides* is a common plant and is well conserved, occurring in at least 23 conservation reserves in south-east Queensland alone (Forster *et al.* 1991).

***Etymology*:** The specific epithet alludes to the superficial similiarity of this plant to species of the Euphorbiaceous genus *Claoxylon*.

***Uses*:** Suitable for wood turning and inlay work (Floyd 1989).

**2. Mallotus discolor** F.Muell. ex Benth., Fl. Austral. 6: 173 (1873). **Type:** New South Wales. Clarence River, *London Exhibition* 82 (holo: K n.v. [photo at BRI]).

***Illustrations*:** Williams (1979: 185, 1987: 199); Floyd (1989: 151); Hauser (1992: 101).

Shrub or small tree to 15 m high; evergreen, perennial, dioecious. Stems ± rounded, with dense silky, clear, simple or biseriate hairs and scattered yellow sessile glands when young, glabrescent. Stipules apparently absent. Leaves alternate, not peltate, petiolate, discolorous; petioles 3–40 mm long, 0.4–0.7 mm diameter, with dense, clear simple, biseriate or stellate (or combination thereof) hairs; basilaminar glands 1 per side of midrib towards lamina base, ellipsoid, 0.3–0.4 mm long, 0.2–0.3 mm wide; lamina lanceolate-ovate, obovate or ovate, 10–110 mm long, 5–70 mm wide; palminerved, comprising 2 veins from the lamina base, 5–8 lateral veins per side of midrib and reticulate interlateral veins; upper surface glossy dark-green, lateral and interlateral veins barely visible, without granular inclusions, with dense clear, simple, biseriate and/or stellate hairs when young, soon becoming scattered with age; lower surface pale green to silver-green, lateral venation well developed, interlateral veins just visible, with dense, clear, simple, biseriate and/or stellate hairs and sparse yellow sessile glands, indumentum persistent; tip acute, short acuminate; base cuneate, rounded or truncate; margins entire or weakly sinuate. Inflorescences racemose, up to 70 mm long, with dense, clear stellate hairs; bracts lanceolate-triangular, 0.3–0.7 mm long, 0.3–0.4 mm wide, with dense clear stellate hairs. Male flowers 1- 5 per bract; pedicels 0.6–2 mm long, 0.5–0.6 mm diameter, with dense clear, stellate hairs; calyx 2 or 3-lobed, lobes lanceolate-ovate, often unequal, 1.6-2.2 mm long, 1.4–1.6 mm long, with dense, clear stellate hairs and occasional yellow sessile glands; disk glands absent; stamens 24–38; filaments fused at base for up to 0.2 mm, 0.4–0.5 mm long, c. 0.1 mm diameter, glabrous; anthers oblong, 0.4–0.5 mm long, 0.4–0.5 mm wide, glabrous, with a yellow glandular cap. Female flowers 1 per bract; pedicels 0.7–1 mm long, 0.5–0.7 mm diameter, with dense, clear stellate hairs; calyx 3 or 4-lobed, lobes lanceolate-ovate, 1.6–2 mm long, 0.6–1.2 mm wide, with dense, clear stellate hairs; ovary 3–4 locular, subglobose, 1.8–2 mm long, 1.1–2.5 mm diameter, with dense yellow sessile glands, echinate processes absent. Styles 3(4), 1.2–2.3 mm long, connate at base for 0.3–0.4 mm, plumose, glabrous on backs. Fruits subglobose, 5–8 mm long, 7–10 mm diameter, with dense, yellow to yellow-orange sessile glands, echinate processes absent. Seeds ovoid, 3.5–4 mm long, 3.5–4 mm wide, 3.4–3.6 mm thick, tan-brown. *Yellow kamala*. Fig. 2.

***Selected additional specimens*: Queensland.** Port Curtis District: Farnborough Beach, 4 km N of Yeppoon, 23°06'S, 150°45'E, Sep 1977, *Batianoff* 532 & *McDonald* (BRI); Keppel Sands, 23°20'S, 150°48'E, *Batianoff* 9304 & *Dillewaard* (BRI); Tannum Sands, 23°57'S, 151°22'E, Nov 1987, *Batianoff* 9317 & *Dillewaard* (BRI); Long Beach, Great Keppel Island, 23°11'S, 150°56'E, Nov 1987, *Batianoff* 9747 & *Dillewaard* (BRI); Colosseum Creek, 2 km along forestry road off Blackmans Gap road,

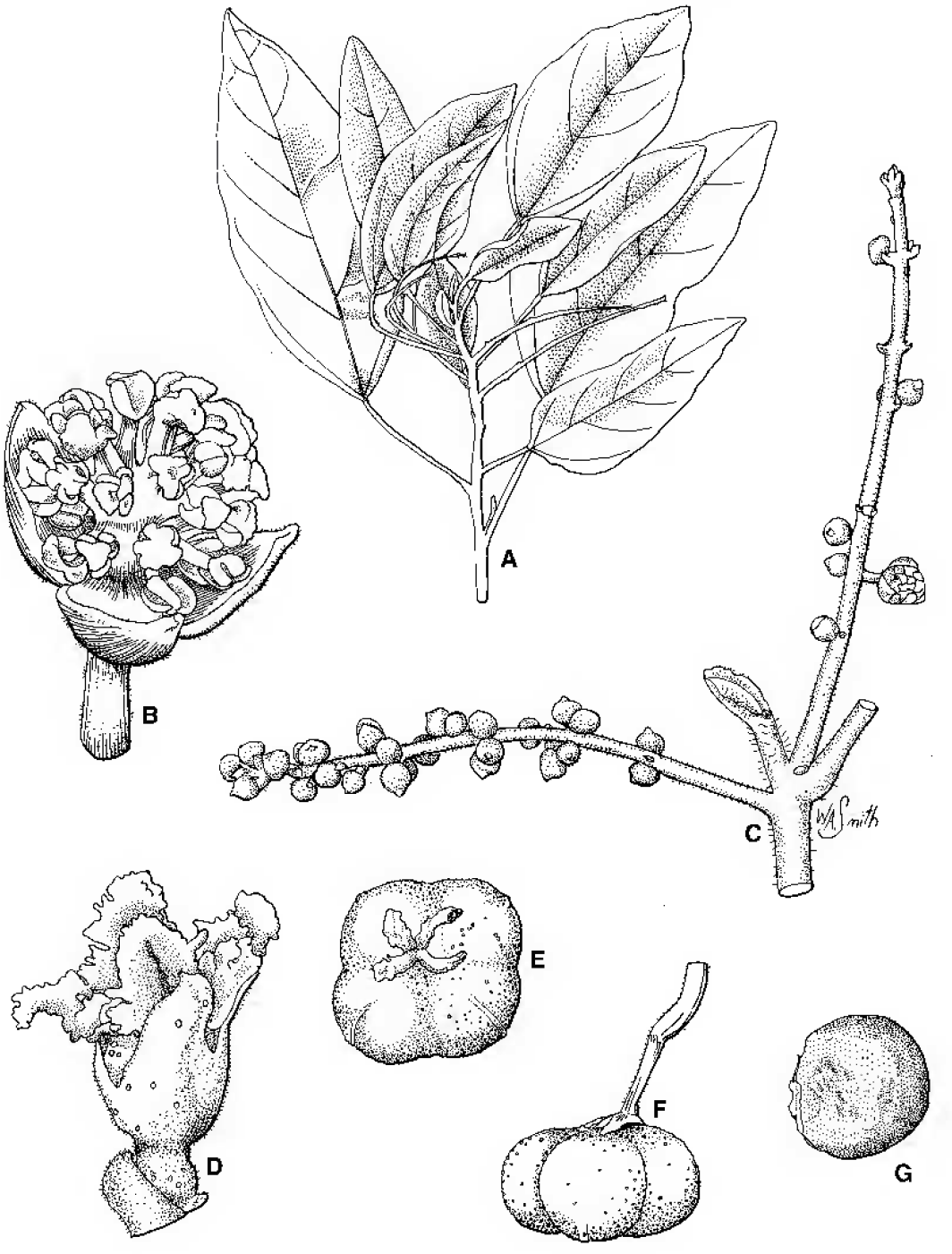



**Fig. 2.** ***Mallotus discolor***. A. twig. x 0.6. B. male flower. x 12. C. inflorescence. x 3. D. female flower. x 12. E & F. fruit. x 4. G. seed. x 6. A from *Forster* 2744 (BRI); B & C from *Forster* 14276 (BRI); D from *Smyrell* AQ541630 (BRI); E-G from *Forster* 9165 (BRI). Del. W. Smith.

24°24'S, 151°28'E, Dec 1993, *Forster* PIF14276 (A, BRI, L, MEL, QRS); Portion 6V, Castletower, 24°09'S, 151°16'E, Dec 1987, *Gibson* 1032 (BRI); Deepwater N.P., 40 km E of Miriam Vale, 24°19'E, 151°58'E, Oct 1989, *Gibson* TOI873 (BRI). Wide Bay District: Sugarbag Creek, 8 km SSW of Pialba, 25°24'S, 152°32'E, Jan 1987, *Forster* PIF2826 (BRI, MEL); Ocean Park Estate, Dundowran, Nov 1991, *Forster* PIF9165 & *Smyrell* (A, AD, BRI, CANB, CBG, K, L, MEL, MO, NSW, NY, PERTH, QRS); Fairlies Knob area, 25°29'S, 152°17'E, Dec 1992, *Forster* PIF12572 & *Smyrell* (BRI); The Hummock near Bundaberg, Dec 1938, *Goy* 627 & *Smith* (BRI); Tinana Creek, 7 km ENE of Tiaro, 25°42'S, 152°39'E, Jan 1992, *Smyrell* [AQ541630] (BRI). Moreton District: Goat Island, c. 1 km W of Dunwich on Stradbroke Island, 27°31'S, 153°24'E, Nov 1973, *Sharpe* 867 & *Durrington* (BRI); Coolum Beach, Dec 1978, *Sharpe* 2472 (BRI); Mt Eerwah, 4 km W of Eumundi, 26°29'S, 152°55'E, Jan 1985, *Sharpe* 3676 (BRI, MEL); Mt Glorious, May 1920, *White* [AQ203755] (BRI); World's End Pocket, Pine Mt, c. 11 km N of Ipswich, 27°36'S, 152°45'E, Dec 1983, *Williams* 83075 (BRI). **New South Wales.** Bexhill, Jan 1895, *Baker* [MEL708513] (MEL).

***Distribution and habitat*:** *Mallotus discolor* occurs in the Port Curtis, Wide Bay and Moreton districts in Queensland and the extreme north-east of New South Wales (Map 2). Plants grow in araucarian microphyll vineforest and littoral vineforest on a variety of substrates, but generally on sandy or alluvial soils.

***Phenology*:** Flowers October to January; fruits November to April.

***Notes*:** Airy Shaw considered that *Mallotus discolor* had a northern limit in the North Kennedy district; however, these records pertain to *M. nesophilus*. *Mallotus discolor* and *M. nesophilus* are superficially similar plants but may be easily distinguished by a number of vegetative and floral characters. The former has indistinct interlateral veins in the lower leaf lamina surface, male flowers with lanceolate-ovate sepals and 24–38 stamens, and the fruit with yellow to yellow-orange sessile glands, whereas the latter has well developed interlateral veins in the lower leaf surface, male flowers with obovate sepals and 50–60 stamens and the fruit with orange sessile glands.

***Conservation status*:** *Mallotus discolor* is a common plant and is well conserved occurring in at least 7 conservation reserves in south-east Queensland (Forster *et al.* 1991).

***Etymology*:** The specific name is from Latin and alludes to the *discolorous* nature of the leaf lamina in this species.

***Uses*:** None recorded.

**3. Mallotus dispersus** P.I.Forst., **sp. nov.** affinis *M. didymochryseo* Airy Shaw a qua in habitu frutice deciduo usque 2–5 m alto; lamina foliorum plerumque glandibus abaxialibus flavis sessilibus; inflorescentia masculina 50–100 mm longa pedunculo 0.5–1.2 mm diametro; pedicellis florum masculinorum 1.5–3.5 mm longis, et femineorum 3-5 mm longis et 0.8–1 mm diametro; et stylis 3.5–5 mm longis differt. **Typus:** Queensland. Cook District: Muddy Bay, Cape York, 10°43'S, 142°33'E, 25 Jun 1994, *P.I. Forster* PIF15304 & *M.C. Tucker* (holo: BRI [2 sheets + spirit]; iso: A, BISH, CANB, DNA, K, L, MEL, NSW, QRS).

[*Mallotus didymochryseus* auct., non Airy Shaw; Airy Shaw (1981); Hyland & Whiffin (1993)]

***Illustration*:** Christophel & Hyland (1993: 108, t. 46A).

Shrub 2–5 m high; seasonally deciduous, perennial, dioecious. Stems ± rounded towards apices, with dense, yellow stellate hairs when young, glabrescent and lenticellate with age. Stipules acuminate-lanceolate, 0.8–1 mm long, 0.7–0.8 mm wide, with sparse, silver to yellow stellate hairs. Leaves opposite, not peltate, petiolate, discolorous; petioles 16–90 mm long, 1–2 mm diameter, with dense, silver to yellow stellate hairs; basilaminar glands 1–6 per side of midrib near lamina base, ellipsoid, 0.4–0.8 mm long, 0.3–0.5 mm wide; lamina broad-ovate, elliptic-ovate, 25–150 mm long, 20–140 mm wide; palminerved, comprising 5–7 veins from lamina base, 4–5 lateral veins per side of midrib and reticulate interlateral veins; upper surface glossy dark-green, lateral veins visible, without granular inclusions, with dense, silver to yellow stellate hairs when young becoming scattered or sparse with age; lower surface pale green,

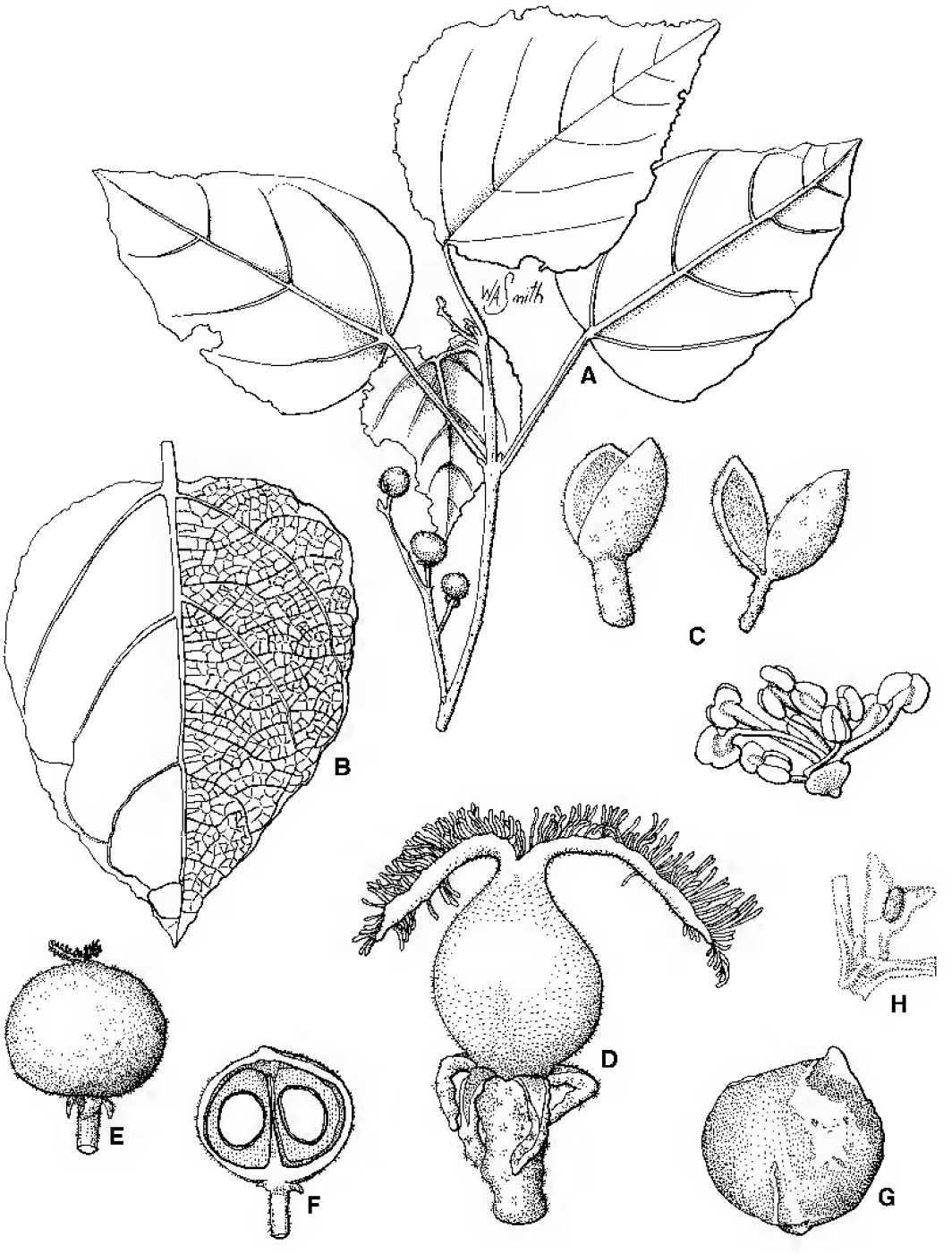



**Fig. 3.** ***Mallotus dispersus***. A. fruiting twig. x 0.5. B. undersurface of leaf. x 1. C. male flower and sepals. x 5. D. female flower. x 5. E. fruit from side. x 2. F. cross-section of fruit. x 2. G. seed. x 4. H. node with stipule highlighted. x 2. A, B, E-G from *Forster* 15304 (BRI); C & H from *Russell-Smith* 4675 (BRI); D from *Hyland* 13808 (QRS). Del. W. Smith.

lateral and interlateral venation well developed, velutinous with dense, silver to pale brown stellate hairs and sparse, pale-yellow sessile glands; tip acute, short acuminate; base cordate or rounded; margins sinuate or weakly dentate with 12–18 teeth up to 1 mm long. Inflorescences racemose, up to 100 mm long, with dense, ginger stellate hairs; bracts lanceolate to triangular, 1–1.5 mm long, 0.3–1.5 mm wide, with dense, silver to yellow stellate hairs. Male flowers 1–3 per bract; pedicels 1.5–3.5 mm long, 0.8–1 mm diameter, with dense yellow or silver stellate hairs; calyx 4-lobed, lobes narrow obovate, 3–3.5 mm long, 1.8–3 mm long, with dense ginger or yellow stellate hairs; disk glands absent; stamens 62–78, free; filaments filiform, 0.6–2.5 mm long, c. 0.1 mm diameter, glabrous; anthers oblong, 0.5–0.7 mm long, 0.5–0.7 mm wide, with an occasional stellate hair, glandular cap absent. Female flowers 1 per bract; pedicels 3–5 mm long, 0.8–1mm diameter, with dense, ginger and/or yellow stellate hairs; calyx 4-lobed, lobes lanceolate, 3–5 mm long, c. 1 mm wide, with dense ginger and/or yellow stellate hairs; ovary 2-locular, ± ovoid, 3.5–7 mm long, 4–6 mm diameter, with dense yellow stellate hairs and dense yellow sessile glands, without echinate processes; styles 2, 3.5–5 mm long, connate at base for 0.5–1 mm, plumose with dense, silver to yellow stellate hairs on backs. Fruits flattened subglobose, 8–12 mm long, 13–18 mm diameter, with dense, orange-yellow simple-stellate hairs and dense, glandular-based stellate hairs, echinate processes absent. Seeds ovoid, 5–7 mm long, 5–6 mm wide, 4.5–5 mm thick, tan-brown. Fig. 3.

***Selected additional specimens*: Western Australia.** Mitchell Plateau, 14°52'S, 125°50'E, Apr 1988, *Dunlop* 7873 (DNA, MEL, PERTH); Bougainville Peninsula, 2 km SW of August Point, Vansittart Bay, 14°05'S, 126°11'E, May 1984, *Forbes* 2191 (BRI, CANB, DNA, MEL, PERTH); Prince Frederick Harbour, 15°00'S, 125°21'E, Jan 1989, *Hyland* 13808 (QRS), 13809 (QRS); 4.6 km NNE Savage Hill, Bigge Island,14°35'S, 125°11'E, Jun 1987, *Kenneally* 10165 & *Hyland* (DNA, PERTH); 10 km NW of September Point, near Cape Bougainville, 14°04'S, 126°08'E, Jun 1987, *Kenneally* 10219 & *Hyland* (PERTH); 3.4 km SW of Manning Peak, Prince Frederick Harbour, Jun 1987, *Kenneally* 10275 & *Hyland* (PERTH, QRS); South West Osborne Island, North Kimberley coast, 14°22'S, 125°57'E, Jun 1988, *Kenneally* 10744 & *Hyland* (BRI, CANB, DNA, PERTH); 3.4 km SW of Manning Peak by Prince Frederick Harbour, 15°00'S, 125°21'E, Jan 1989, *Kenneally* 10841 & *Hyland* (BRI, DNA, PERTH); Osborne Island, SW island, Bonaparte Archipelago, 14°26'S, 125°56'E, Jun 1973, *Wilson* 11045 (PERTH). **Northern Territory.** Groote Eylandt, Umbakumba, 4 Mile Jungle, 13°52'S, 136°47'E, Jul 1987, *Russell-Smith* 2743 & *Lucas* (BRI, CANB, DNA); ditto, *Russell-Smith* 2971 & *Lucas* (BRI, DNA); Gove Peninsula, 2 km NE of Port Bradshaw, 12°27'S, 136°49'E, Sep 1987, *Russell-Smith* 3389 & *Lucas* (BRI, DNA); 0.5 km W of Little Bondi, Gove Peninsula, 12°18'S, 136°56'E, Feb 1988, *Russell-Smith* 4715 & *Lucas* (BRI, CANB, DNA); Dalywoi Bay, Gove, 12°23'S, 136°53'E, Feb 1988, *Russell-Smith* 4935 & *Lucas* (BRI, DNA); Holly Inlet, Port Bradshaw, NE Arnhem Land, 12°36'E, 136°42'E, Feb 1988, *Russell-Smith* 4941 & *Lucas* (BRI, DNA); Bagbiringula Point, NE Arnhem Land,13°09'S, 136°31'E, Feb 1988, *Russell-Smith* 4977 & *Lucas* (BRI, DNA); NE Arnhem Land, Guyuwiri Point, 13°01'S, 136°35'E, Feb 1988, *Russell-Smith* 4999 & *Lucas* (BRI, DNA); Yirrikala, E Arnhem Land, 12°13'S, 136°54'E, Jan 1974, *Scarlett* 300 (DNA); Little Lagoon, Groote Eylandt, May 1948, *Specht* 437 (AD, BRI, MEL). **Queensland.** Big Creek, Prince of Wales Island, Torres Strait, 10°45'S, 142°15'E, Feb 1975, *Cameron* 20315 (QRS).

***Distribution and habitat*:** *Mallotus dispersus* is restricted to northern Australia and is disjunct in its distribution with populations at the Gove Peninsula and Groote Eylandt in the Northern Territory, the Kimberley of Western Australian and Torres Strait and the northern extremity of Cape York Peninsula in Queensland (Map 6). Plants grow in semi-deciduous notophyll vineforest and vinethickets on sand-dunes behind the foreshore.

***Phenology*:** Flowers January to February; fruits January to September.

***Notes*:** The only Australian collection (*Specht* 437) of this species seen by Airy Shaw was identified as *Mallotus didymochryseus* Airy Shaw (1981). He commented that "The leaves of this specimen are less than 10 cm in diameter", undoubtedly in comparison to the considerably larger leaves of collections of authentic *M. didymochryseus* from Papua New Guinea. *M. didymochryseus* is based on a collection from Central Province in southern Papua New Guinea and occurs in evergreen rainforests on deep soils as an evergreen, small tree 10–20 m high. By comparison the superficially similar Australian plant occurs in semi-decidous notophyll vineforest and

vinethickets on sand-dunes behind the foreshore and is a seasonally deciduous shrub, 2–5 m high. *M. didymochryseus* has leaf laminas without yellow sessile glands below; male inflorescences 120–210 mm long on peduncles 1.8–2 mm diameter; male flower pedicels 3.5–4 mm long; female flower pedicels 5–8 mm long, 1.4–1.5 mm diameter; styles 2.5–3.2 mm long, whereas *M. dispersus* has leaf laminas generally with yellow sessile glands below; male inflorescences 50–100 mm long on peduncles 0.5–1.2 mm diameter; male flower pedicels 1.5–3.5 mm long; female pedicels 3–5 mm long, 0.8–1 mm diameter and styles 3.5–5 mm long.

***Etymology*:** The specific name is derived from the Latin *dispersus* and refers to the dispersed nature of the known populations of this plant.

***Uses*:** None recorded.

***Conservation status*:** Uncommon, but not considered rare or threatened at this stage.

**4. Mallotus ficifolius** (Baill.) Pax & K.Hoffm. in Engl. & Prantl., Natur. Pflanzenf. 7: 151 (1914); *Echinus claoxyloides* var. *ficifolia* Baill., Adansonia 6: 315 (1866); *M. claoxyloides* var. *ficifolius* (Baill.) Benth., Fl. Austral. 6: 141 (1873). **Type:** Queensland. PORT CURTIS DISTRICT: Rockhampton, 24 Dec 1862, *Dallachy* 47 (lecto [here designated]: MEL [MEL515951]).

*Mallotus claoxyloides* f. *grossedentata* Domin, Biblioth. Bot. 89: 888 (1928). **Type:** Queensland. SOUTH KENNEDY DISTRICT: "Prope Brisbane River" [probably actually Port Mackay], 1863-1865, *A. Dietrich* 1834 (holo: PR; iso: MEL).

*Mallotus claoxyloides* var. *macrophylla* Benth., Fl. Austral. 6: 141 (1873). **Type:** Queensland. COOK DISTRICT: Rockingham Bay, *Dallachy* (holo: K n.v. [photo at BRI]; iso: MEL [MEL708581, 708574, 232382]).

Shrub or small tree to 6 m high; evergreen, perennial, usually dioecious but occasionally monoecious. Stems flattened towards apices, with dense, velutinous, yellow, stellate hairs when young, becoming sparse with age. Stipules linear-lanceolate, 4–10 mm long, 0.5–1 mm wide, with dense, yellow stellate hairs. Leaves opposite, not peltate, petiolate, discolorous; petioles 7–80 mm long, 1–2 mm diameter, with dense, yellow stellate hairs; basilaminar glands 2 or 4 per side of midrib towards lamina base, ellipsoid to oblong, 1.2–1.6 mm long, 0.6–0.8 mm wide; lamina elliptic, lanceolate-ovate, obovate or ± orbicular, 50–250 mm long, 22–250 mm wide; penninerved, comprising 6-8 lateral veins per side of midrib and reticulate interlateral veins; upper surface dull green, lateral veins barely visible, without granular inclusions, with sparse velutinous, yellow stellate hairs becoming scattered with age; lower surface pale green, lateral and interlateral venation well developed, with dense velutinous, yellow, stellate hairs and scattered, yellow sessile glands, becoming sparse with age; tip acute or acuminate; base cordate, rounded or truncate; margins strongly dentate with 12-15 teeth, each 2–7 mm long, strongly toothed on juvenile foliage. Inflorescences racemose, up to 90 mm long, with dense, yellow stellate hairs; bracts lanceolate, 2.6–4 mm long, 0.8–1 mm wide, with sparse, yellow stellate hairs. Male flowers 1–7 per bract; pedicels 2–5 mm long, 0.8–1 mm diameter, with dense, yellow stellate hairs; calyx 3-lobed, lobes obovate, 3–4 mm long, 1.5–2 mm long, with sparse to dense, yellow stellate hairs; disk glands absent; stamens 28-42, free; filaments flattened-filiform, 1.5–4 mm long, c. 0.1 mm diameter, glabrous or with a few scattered, yellow stellate hairs; anthers oblong, 0.2–0.3 mm long, 0.2–0.3 mm wide, glabrous, glandular cap absent. Female flowers 1-5 per bract; pedicels 2.6–25 mm long, 2–2.5 mm diameter, with dense velutinous, yellow stellate hairs; calyx 3-lobed, lobes lanceolate, 3–5 mm long, 1.2–2 mm wide, with sparse to dense, yellow stellate hairs; ovary 3(4)-locular, subglobose, 2–3 mm long, 3–5.5 mm diameter, with dense, yellow stellate hairs and simple echinate processes to 1 mm long that have dense, yellow simple or biseriate hairs; styles 3, 3–4 mm long, connate at base for c. 1 mm, plumose and with sparse, yellow stellate hairs on backs. Fruits subglobose, 8–10 mm long, 13–15 mm diameter, with simple echinate processes to 3 mm long that have sparse to dense, yellow simple or biseriate hairs and scattered, yellow sessile glands. Seeds ovoid, 3.8–5.5 mm long, 3.5–4.5

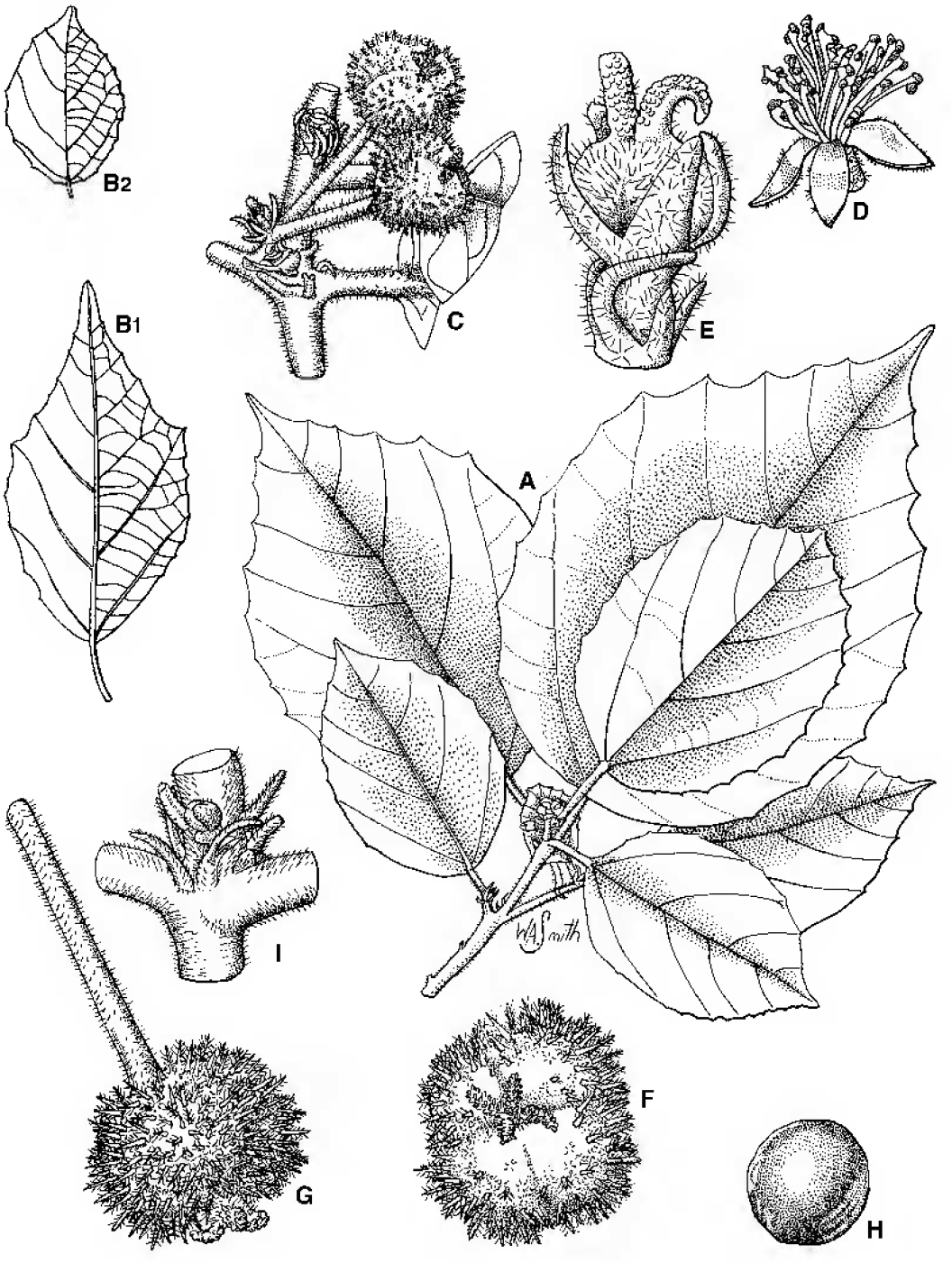



**Fig. 4. Mallotus ficifolius**. A. flowering twig. x 0.4. B. undersurface of leaves. x 0.4. C. fruiting inflorescence. x 1. D. male flower. x 5. E. female flower. x 5. F & G. fruit. x 2. H. seed. x 4. I. leaf node showing stipules. x 2. A, C, F, G, I from *Forster* 13591 (BRI); B1, D, E from *Forster* 13571 (BRI); B2 & H from *Forster* 8893 (BRI). Del. W. Smith.

mm wide, 3–4.5 mm thick, tan-brown. Fig. 4.

***Selected additional specimens*: Queensland.** Cook District: Cooktown Botanic Gardens, 15°28'S, 145°15'E, Nov 1988, *Burkitt* 37 (BRI); T.R. 106, Poverty L.A., 16°00'S, 145°15'E, Jul 1973, *Dockrill* 680 (BRI, QRS); Freshwater Creek, Jungara, Dec 1936, *Flecker* N.Q.N.C.2672 (BRI); 2 km SE of Kennedy Hill, 12°28'S, 143°15'E, Jul 1991, *Forster* PIF8893 (BRI); Rocky River Scrub, Silver Plains Station, eastern fall of McIlwraith Range, 13°49'S, 143°27'E, Jun 1992, *Forster* PIF10624 et al. (BRI, QRS); Chili Creek Crossing, road to Portland Roads, 12°38'S, 143°22'E, Jul 1993, *Forster* PIF13571 et al. (BRI, MEL, QRS); S.F.R. 756, East McNamee, 17°40'S, 145°50'E, Nov 1971, *Hyland* 5630 (BRI, QRS); Claudie River, 12°45'S, 143°15'E, Oct 1974, *Hyland* 7802 (BRI, CANB, QRS); Endeavour River North Arm crossing with McIvor River - Cooktown road, 15°25'S, 145°05'E, Nov 1981, *Irvine* 2177 (QRS); Gap Creek, Bloomfield, May 1978, *Scarth-Johnson* 762A (BRI); Cedar Bay, 15°49'S, 145°20'E, Jan-Mar 1973, *Tracey* 14668 (BRI); Grassy Hill, Cooktown, 15°28'S, 145°15'E, Jul 1991, *Waterhouse* 1870 (BRI, DNA, MBA). South Kennedy District: Port Mackay, [undated] *Dietrich* 2479 (AD). Port Curtis Curtis: "Netherleigh", c. 26 km SE of Calliope, 24°14'S, 151°20'E, Aug 1984, *Anderson* 3789 (BRI); Boynedale, near Gladstone, Nov 1980, *Cowie* 52 (BRI); Moores Creek, Berserker Range, 23°19'S, 150°33'E, Nov 1992, *Forster* PIF12257 & *Machin* (BRI, K, L, MEL, QRS); Pine Creek off lower reaches of Granite Creek, S.F. 391 Bulburin, 24°37'S, 151°33'E, Dec 1993, *Forster* PIF14583 et al. (BRI); Iveragh Creek, Castletower, Portion 9, 22 km SE of Calliope, 24°07'S, 151°21'E, Oct 1988, *Gibson* TOI297 (BRI, NSW); Moores Creek, 23°20'S, 150°35'E, Oct 1976, *Hyland* 9086 (BRI, QRS); North Rockhampton, Jul 1935, *White* 12143 (BRI).

***Distribution and habitat*:** *Mallotus ficifolius* is endemic to Queensland but is disjunct in its occurrence with populations on Cape York Peninsula, the 'Wet Tropics', Mackay (historical only and perhaps the locality is suspect) and from Rockhampton south to Granite Creek (Map 4). Plants grow on the margins of notophyll vineforest, along seasonal watercourses or on woodland on grassy hillsides.

***Phenology*:** Flowers and fruits throughout the year.

***Notes*:** *Mallotus ficifolius* is a variable species in leaf size with some very small forms and some large ones. Airy-Shaw considered *Mallotus ficifolius* as a variety of *M. claoxyloides* and also chose to recognise the variety *cordatus* as distinct, although he did mention that the two were doubtfully distinct. Some plants, particularly those near Rockhampton are very small (< 1.5 m high) in stature and in foliage size. All of the plants in the north of the state are much larger in stature and foliage, as are those from near Gladstone in more mesic conditions than the Rockhampton ones. It is usually possible to find some small leaves on predominantly large-leaved plants, hence it is concluded that leaf size is dependent on seasonal moisture availability.

This species is predominantly dioecious, although there is at least one known example (*Waterhouse* 1870) where plants are definitely monoecious.

There are two sheets [MEL515958 & 515951] at MEL collected by Dallachy at Rockhampton that qualify as syntypes of *Mallotus claoxyloides* var. *ficifolius*. MEL515951 is the better sheet with both male and female twigs, as well as a date, and is selected here as lectotype of the name.

***Conservation status*:** Not at risk at this stage. Present in Iron Range N.P. and Mt Archer C.P. at Rockhampton.

***Etymology*:** The specific epithet is derived from Latin and alludes to the resemblance of the foliage to that of some species of *Ficus* (Moraceae).

***Uses*:** None recorded.

**5. Mallotus megadontus** P.I.Forst., **stat. et nom. nov.** *Mallotus claoxyloides* var. *angustifolia* F.M.Bailey, Bot. Bull. 2: 18 (1891). [non *Mallotus angustifolius* Benth.] **Type:** Queensland. Moreton District: Maroochy (Yandina), 1 Mar 1891, *F.M. Bailey* (holo: BRI; iso: MEL [MEL708570]).

*Mallotus* sp. (Cooroy P.R.Sharpe+ 4913) (Forster & Henderson 1997: 74).

Small shrub 0.5–2 m high; evergreen, perennial, monoecious, often functionally dioecious. Stems flattened towards apices, with sparse, clear to ginger simple and stellate hairs when young, glabrescent and lenticellate with age.

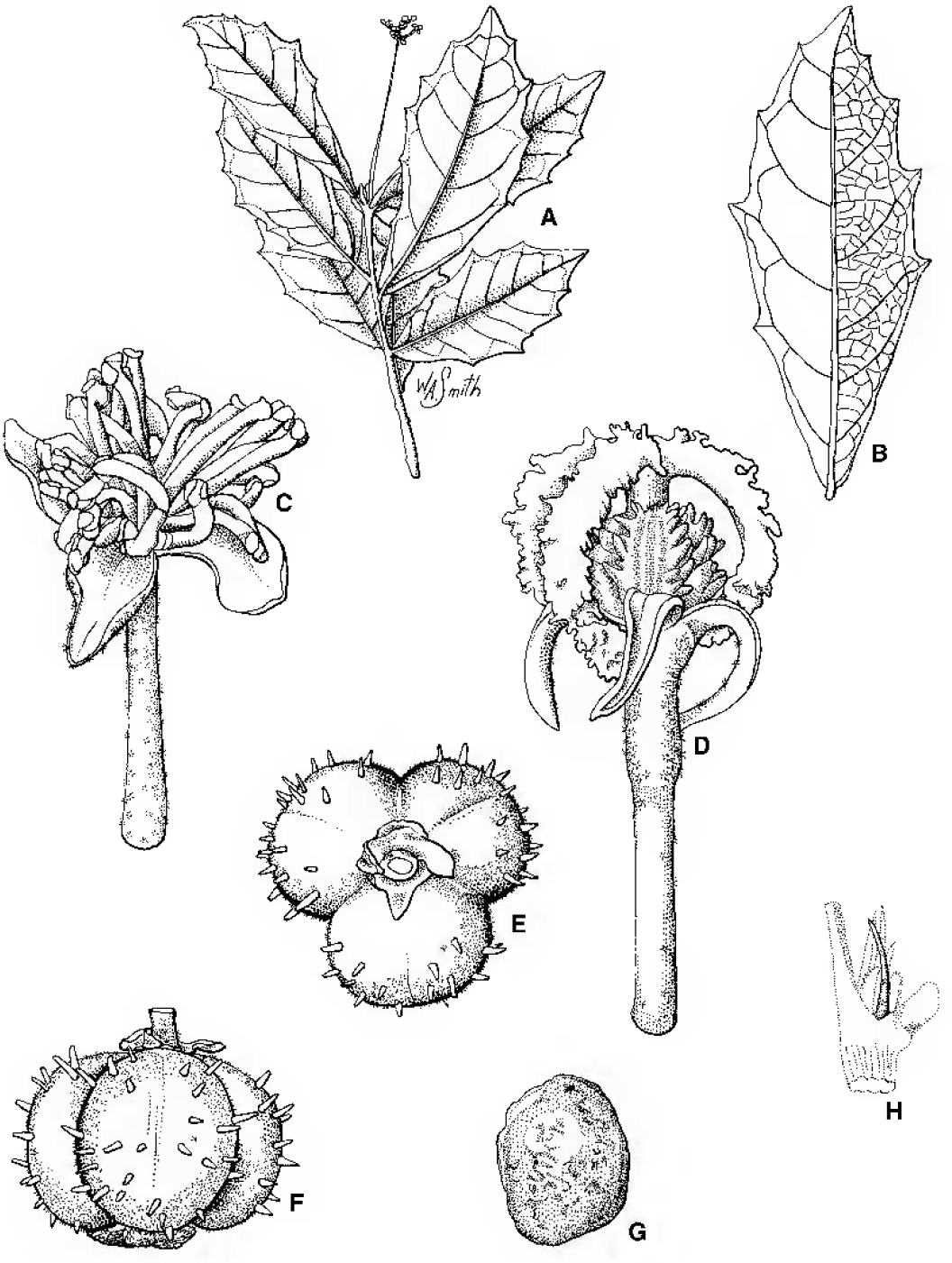



**Fig. 5.** ***Mallotus megadontus***. A. flowering twig. x 0.5. B. undersurface of leaf. x 1. C. male flower. x 8. D. female flower. x 8. E & F. fruit. x 4. G. seed. x 4. H. internode with stipule emphasized. x 4. A-C from *Smith* 5149 (BRI); D from *Bean* 970 (BRI); E & F from *Simmonds* AQ203722 (BRI); G & H from *Sharpe* 4782 (BRI). Del. W. Smith.

Stipules linear-lanceolate, 2.5–4 mm long, 0.6–1.1 mm wide, with sparse, clear to yellow stellate hairs. Leaves opposite, not peltate, petiolate, discolorous; petioles 2–9 mm long, 1–1.5 mm diameter, with sparse, ginger to yellow stellate hairs; basilaminar glands 2–5 per side of midrib towards lamina base, ellipsoid, 0.4–1 mm long, 0.3–0.5 mm wide; lamina oblanceolate or obovate, rarely rhombic-ovate, 17–160 mm long, 5–70 mm wide; penninerved, comprising 11–17 lateral veins per side of midrib and reticulate interlateral veins; upper surface glossy dark-green, lateral and interlateral veins well developed, without granular inclusions, with scattered to sparse, yellow stellate hairs when young, glabrescent; lower surface pale green, lateral and interlateral venation well developed, with sparse, clear to ginger stellate hairs when young, glabrescent; tip acute, short acuminate or rarely obtuse; base cuneate to weakly attenuate; margins strongly dentate with 4–7 teeth, each 2–9 mm long. Inflorescences racemose, up to 60 mm long, with sparse, clear to ginger stellate hairs; bracts linear-lanceolate, 1–2.5 mm long, 0.2–0.3 mm wide, with sparse, clear to ginger stellate hairs. Male flowers 1–5 per bract; pedicels 3–5 mm long, 0.5–0.9 mm diameter, with sparse, clear to ginger stellate hairs; calyx 3-lobed, lobes obovate, 3–4.2 mm long, 1.5–2.5 mm long, with sparse, clear to ginger stellate hairs; disk glands absent; stamens 40–60, free; filaments filiform, 1.5–3.5 mm long, 0.2–0.3 mm diameter, glabrous; anthers oblong, 0.4–0.5 mm long, 0.6–0.7 mm wide, glabrous, glandular cap absent. Female flowers 1 per bract; pedicels 1–16 mm long, 0.7–1 mm diameter, with sparse, clear to ginger stellate hairs; calyx 3 or 4-lobed, lobes lanceolate, 3–3.9 mm long, 1–1.4 mm wide, with sparse, yellow stellate hairs and scattered yellow sessile glands; ovary 3-locular, subglobose, c. 2 mm long and 2.5 mm diameter, with dense yellow stellate hairs, scattered yellow sessile glands and simple echinate processes 0.1–0.4 mm long; styles 3, 2.5–4 mm long, connate at base 0.5–0.7 mm, plumose with scattered simple hairs on backs. Fruits subglobose, 5–7 mm long, 8–10 mm diameter, with sparse to dense, yellow stellate hairs, scattered yellow sessile glands and simple, echinate processes 0.5–2 mm long. Seeds ovoid, 4.8–6 mm long, 4.2–4.5 mm wide, 3.8–4.5 mm thick, tan-brown. Fig. 5.

***Specimens examined*: Queensland.** MORETON DISTRICT: Bank of Petrie Creek, W of Woombye, 26°40'S, 152°55'E, Nov 1988, *Bean* 970, 971 (BRI); 6 km W of Woombye, 26°39'S, 152°55'E, Feb 1990, *Bean* 1347 (BRI); Platypus Creek, Dulong, west of Nambour, 26°38'S, 152°54'E, Dec 1993, *Bean* 7199 & 7200 (BRI); Council Beauty Spot, 1 km E of Mt Cooroy, 26°26'S, 152°58'E, Nov 1990, *Forster* PIF7593 & *Sharpe* (BRI); Kureelpa Falls, 26°35'S, 152°53'E, Dec 1992, *Forster* PIF12440 & *Sharpe* (BRI); Buderim Mt, Jan 1919, *Gwyther* [AQ203725] (BRI); Eerwah Creek, base of Mt Eerwah, c. 5 km W of Eumundi - Kenilworth road, 26°28'S, 152°54'E, Jan 1988, *Sharpe* 4782 (BRI, NSW); Mt Cooroy, c. 4 km E of Cooroy, 26°26'S, 152°57'E, Nov 1988, *Sharpe* 4837 et al. (BRI); ditto, Nov 1989, *Sharpe* 4913 & *Thomas* (BRI); ditto, Oct 1989, *Sharpe* 4901 & *Bean* (BRI); ditto, Nov 1989, *Sharpe* 4913 & *Thomas* (BRI); Yandina, Mar 1891, *Simmonds* [AQ203722] (BRI); Eumundi, Oct 1918, *Simmonds* [AQ203724] (BRI); Yatala, 27°44'S, 153°13'E, Dec 1953, *Smith* 5149 (BRI).

***Distribution and habitat*:** Restricted to the Moreton district of south-east Queensland (Map 6). Plants grow on the margins or in notophyll vineforest often near watercourses.

***Phenology*:** Flowers October to March, fruits December to April.

***Notes*:** *Mallotus megadontus* has been known as the variety *angustifolius* of *M. claoxyloides* since its description by Bailey (1891). *Mallotus megadontus* differs from *M. claoxyloides* most noticeably in the strongly dentate leaf laminae; the leaves with 11–17 lateral veins and lacking sessile yellow glands below; male flowers with thicker staminal filaments (0.2–0.3 mm diameter); and smaller fruit (8–10 mm diameter).

***Conservation status*:** *Mallotus megadontus* is infrequent in south-east Queensland and much suitable habitat throughout its range has been cleared or will be in the near future. The species was not found to occur in any conservation reserves by Forster et al. (1991) in their survey of 232 remnant patches of vineforest in south-east Queensland. An appropriate conservation coding is Rare.

***Etymology*:** The new name is derived from the Greek *mega* (big) and *dontus* (tooth) and alludes to the prominent teeth on the leaf lamina of this species.

***Uses*:** None recorded.

**6. Mallotus mollissimus** (Geisel.) Airy Shaw, Kew Bull. 26: 297 (1971); *Croton mollissimus* Geisel., Croton Monogr. 73 (Mar 1807); *Echinus mollissimus* (Geisel.) Baill., Adansonia 6: 316 (1866). **Type:** Chine [China], *Staunton* (iso: G-DC (single leaf) n.v. [fiche at BRI]).

*Croton ricinoides* Pers., Syn. 2: 586 (Sep 1807); *Mallotus ricinoides* (Pers.) Muell.Arg., Linnaea 34: 187 (1865). **Type:** Inde [India], 1800, *Lahaye* (lecto [here designated]: P-JU 16578 n.v. [fiche at BRI]).

*Mallotus pycnostachys* F.Muell., Fragm. 4: 138 (1864). **Type:** Queensland. North Kennedy District: Mt Elliott, 5 Aug 1863, [MEL232434, 232433, 232430, 232432] (holo: MEL).

***Illustration*:** Christophel & Hyland (1993: 108, t.46 B).

Shrub or small tree to 10 m high; evergreen, perennial, monoecious. Stems ± rounded, with dense, clear to ginger stellate hairs, indumentum persistent. Stipules acuminate-linear, 1.2–1.5 mm long, 0.5–0.8 mm wide, with dense, clear to ginger stellate hairs. Leaves alternate, ± peltate, petiolate, discolorous; petioles 13–230 mm long, 2–3 mm diameter, with dense velutinous, clear to ginger stellate hairs; basilaminar glands usually absent or 1 per side of midrib towards lamina base, ellipsoid, 1.3–1.7 mm long, 0.8–1 mm wide; lamina broadly-ovate, orbicular-ovate or ovate, 45–30 mm long, 22–240 mm wide; venation palminerved, comprising 4 veins from the lamina base, 5–8 lateral veins per side of midrib and reticulate interlateral veins; upper surface matt dark-green, lateral veins barely visible, interlateral veins not visible, without granular inclusions, with dense ginger stellate hairs when young; lower surface silver-white, lateral venation and interlateral venation well developed, with dense velutinous, clear to ginger stellate hairs and dense yellow sessile glands, indumentum persistent; tip short to long acuminate; base cordate, rounded or truncate; margins weakly sinuate or weakly dentate with 10–12 small teeth to 1 mm long. Inflorescences paniculate, up to 170 mm long, with dense velutinous, clear to ginger stellate hairs; bracts linear-lanceolate, 2–5 mm long, 0.4–0.5 mm wide, with dense clear to ginger stellate hairs. Male flowers 1–3 per bract; pedicels 2–2.2 mm long, 0.5–0.6 mm diameter, with dense clear to ginger stellate hairs; calyx 3 or 4-lobed, lobes obovate, 3–4 mm long, 2–2.5 mm long, with dense, clear stellate hairs; disk glands consisting of small irregular lobes; stamens 66-78, free; filaments filiform, 2–5 mm long, c. 0.1 mm diameter, glabrous or with occasional stellate hairs; anthers oblong, 0.3–0.4 mm long, 0.3–0.4 mm wide, glabrous, glandular cap absent. Female flowers 1 per bract; pedicels 1–2 mm long, c. 1 mm diameter, with dense, clear to ginger stellate hairs; calyx 4–lobed, lobes lanceolate-ovate, 2.5–3.5 mm long, 1.5–2 mm wide, with dense, clear to ginger stellate hairs; ovary 3–locular, subglobose, 2–2.5 mm long, 2–3 mm diameter, with dense clear stellate hairs, without echinate processes. Styles 3(4), 2–3 mm long, connate at base for c. 0.5 mm, plumose with dense clear stellate hairs on backs. Fruits subglobose to globose, 5–8 mm long, 7–8 mm diameter, with dense, clear stellate hairs and long echinate processes to 4 mm long that coalesce between adjacent fruit creating a woolly mass. Seeds globose-ovoid, 3.5–4.5 mm long, 3–4 mm wide, 2.8–3 mm thick, tan-black. Fig. 6.

***Selected additional specimens*: Queensland.** Cook District: 2.5 km S of the Lions Den Hotel, Helenvale, 15°43'S, 145°13'E, Jan 1992, *Forster* PIF9526 (BRI, K, L, MEL, QRS); Middle Claudie River Scrub, 12°44'S, 143°14'E, Jun 1994, *Forster* PIF15401 & *Tucker* (BRI, QRS); Home Rule, 15°45'S, 145°17'E, Jul 1994, *Forster* PIF15563 et al. (BRI, MEL, QRS); Cape Kimberley road, 3 km E of Cape Tribulation road, 16°16'S, 145°27'E, Jul 1993, *Forster* PIF13676 *et al.* (A, BRI, K, L, MEL, QRS); S.F. 191 Wongabel, 17°19'S, 145°30'E, Dec 1993, *Forster* PIF14442 (BRI, MEL,QRS); McIvor River, 15°10'S, 145°05'E, Jul 1972, *Hyland* 6267 (BRI, QRS); Johnstone River, Aug 1916, *Michael* [AQ204000] (BRI); Innisfail, *Michael* 401 (BRI); Tolga, Dec 1961, *Wyatt* 9 (BRI). North Kennedy District: Between Mt Fox, Nov 1949, *Clemens* [AQ198257] (BRI); Near Manifold, 22°40'S, 150°45'E, Oct 1976, *Hyland* 9061 (BRI, QRS); Murray River & Lagoon Creek, c. 5 km NE of Bilyana, Jun 1978, *Thorsborne & Travers* (BRI). South Kennedy District: Eungella Range, Jul-Nov 1947,

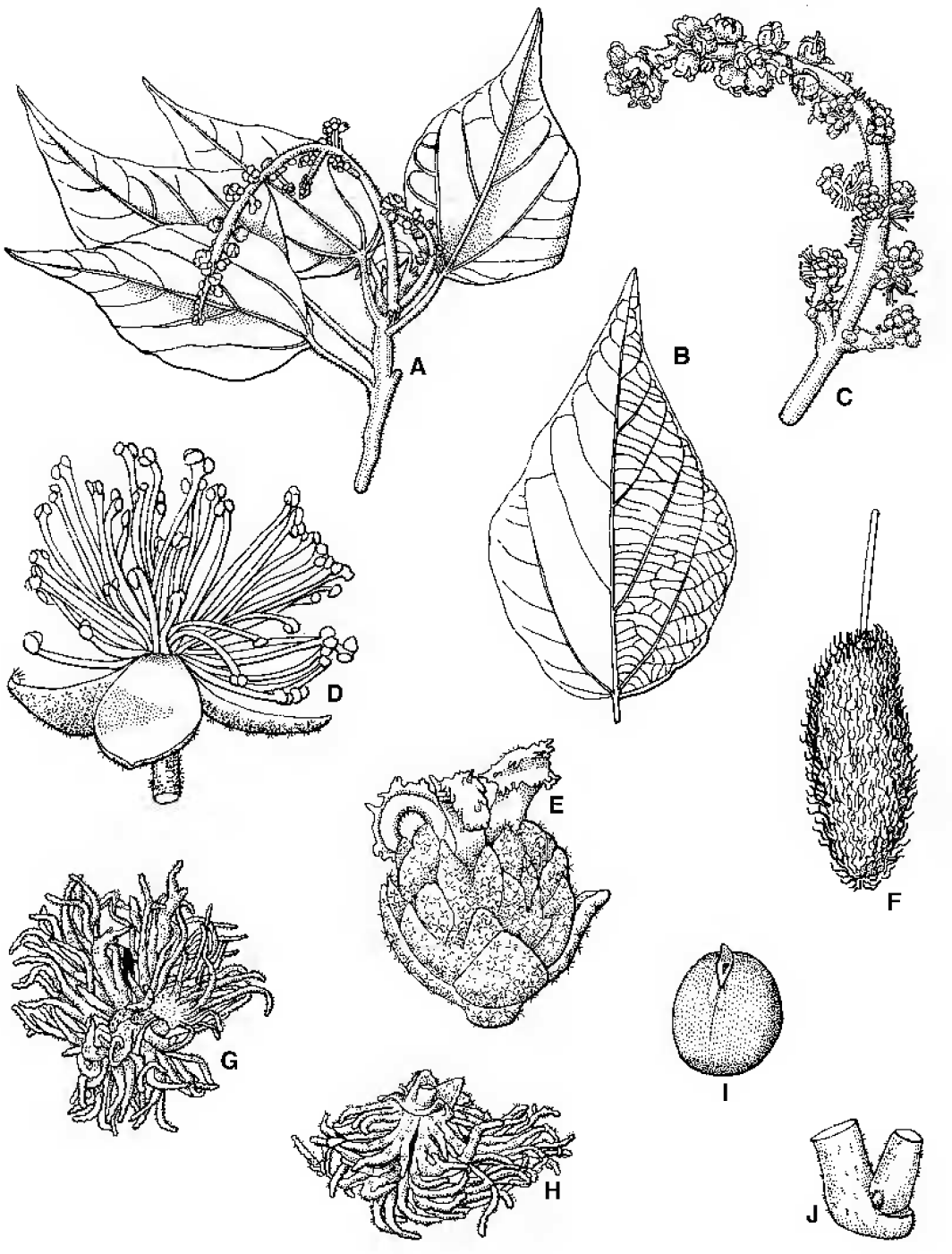



**Fig. 6.** ***Mallotus mollissimus***. A. flowering twig. x 0.5. B. undersurface of leaf. x 0.5. C. inflorescence. x 1. D. male flower. x 8. E. female flower. x 8. F. fruiting inflorescence. x 0.5. G & H. fruit. x 2. I. seed. x 4. J. node with stipule. x 2. A, C, D, E & J from *Forster* 12442 (BRI); B, F, G, H & I from *Forster* 16122 (BRI). Del. W. Smith.

*Clemens* [AQ198256] (BRI); Upper East Funnel creek, Sarina Range, Nov 1986, *Ritchie* 36 (BRI). Port Curtis District: S.F. 391 Bulburin, Camp Creek Crossing, 24°36'S, 151°33'E, Dec 1993, *Forster* PIF14578 et al. (BRI, MEL, QRS); Byfield near Keppel Bay, Sep 1931, *White* 8199 (BRI). Wide Bay District: Kin Kin, Mar 1916, *Francis & White* [AQ204007] (BRI); Mt Wolvi, 26°11'S, 152°52'E, Dec 1992, *Forster* PIF12442 & *Sharpe* (BRI, DNA, K, L, MEL, QRS); Gympie, Oct 1928, *Simmonds* [AQ204009] (BRI); Kin Kin, c. 3 km NE of township on Wolvi road, 26°16'S, 152°52'E, Jan 1993, *Sharpe* 5392 (AD, BRI, MEL, NSW).

***Distribution and habitat***: *Mallotus mollissimus* is widespread in north Queensland and with several disjunct populations in central and southern Queensland. It occurs in Cook, North Kennedy, South Kennedy, Port Curtis and Wide Bay districts (Map 5). The species is also widespread in Malesia and Melanesia. Plants grow as pioneers along creek banks in open forest or the margins of notophyll and mesophyll vineforests on volcanic soils.

***Phenology***: Flowers and fruits throughout the year.

***Notes***: Geiseler (1807) based his taxa on material in the Vahl herbarium. He did not specifically designate a collector for the type collection of *Croton mollissimus*; however, J. Mueller (1866) stated that the *Staunton* collection from China was the type. I could not locate any specimens for a type on the microfiche of the Vahl herbarium at C; however, on the fiche of the De Candolle herbarium at G, amongst the collections labelled as *M. ricinoides*, there is a single leaf collected by Staunton. This botanical scrap is considered an isotype. A search at C and other herbaria is required to determine if a better duplicate exists of the Staunton collection.

No collector was designated for the type collection of *Croton ricinoides*. On the fiche at P-JU, there is a single collection from India s.l. [as Inde] collected by Lahaye in 1800. As there appears to be no other specimen suitable for this type, I have designated it the lectotype of the name.

F. Mueller (1864) described *Mallotus pycnostachya* without referring to material from outside Australia, and his name was soon synonymised both by J. Mueller (1865) and Baillon (1866). There are four sheets at MEL in red type folders that are thought to represent type material of Mueller's *Mallotus pycnostachya*. Two sheets have large single leaves, whereas the others have fruiting twigs. While the label data is incomplete and varies slightly between the four, it is probable that they are all part of the same collection that has been mounted on separate sheets.

***Conservation status***: *Mallotus mollissimus* is a common plant in the northern part of its Australian range; however, it is very infrequent and probably endangered in south-east Queensland (Forster et al. 1991). The populations at Kin Kin and Mt Wolvi are in grossly disturbed habitats and susceptible to destruction from agricultural clearing or road maintenance.

***Etymology***: The specific epithet is derived from Latin and alludes to the 'soft, pliant' nature of the foliage.

***Uses***: None recorded. Probably useful as a pioneer species in rainforest rehabilitation projects.

**7. Mallotus nesophilus** Muell.Arg., Linnaea 34: 196 (1865); *Echinus nesophilus* (Muell.Arg.) Baill., Adansonia 6: 314 (1866). **Type:** Queensland. Cook District: Sweers Island, *Henne* (lecto [here designated]: MEL [MEL708600]; isolecto: G-DC n.v. [fiche at BRI]); lectopara: Cape Flinders, 1819, *A. Cunningham* 295 (G-DC n.v. [fiche at BRI]); Quail Island, 1855, *Flood* (G-DC n.v. [fiche at BRI], MEL [MEL708678]).

***Illustrations***: Brock (1988: 248); Christophel & Hyland (1993: 109, t.47B); Kenneally et al. (1996: 105).

Shrub or small tree to 8 m high; evergreen, perennial, dioecious. Stems ± rounded towards apices, with sparse to dense, clear, simple and stellate hairs when young, glabrescent and lenticellate with age. Stipules apparently absent. Leaves alternate or rarely subopposite, not peltate, petiolate, discolorous; petioles 3–120 mm long, 0.5–1.5 mm diameter, with sparse, clear, simple, biseriate or stellate hairs; basilaminar

glands 1 or 2 per side of midrib towards lamina base, circular to ellipsoid, 0.5–1 mm long, 0.4–0.5 mm wide; lamina obovate, orbicular, ovate, rhombic-ovate, 10–170 mm long, 5–80 mm wide; venation ± palminerved, comprising 1 or 2 lateral veins from the lamina base, an additional 5–7 lateral veins further up the midrib and with reticulate interlateral veins; upper surface glossy dark-green, lateral veins visible, interlateral veins not visible, with scattered to dense, clear, simple, biseriate or stellate hairs, glabrescent, without granular inclusions; lower surface silver-green, lateral and interlateral venation well developed, velutinous with dense, clear ± peltate scales, simple, biseriate or stellate hairs (or a combination thereof) and dense yellow sessile glands, indumentum persistent; tip acute, short acuminate or rounded; base cordate, cuneate or rounded; margins generally entire, but sometime weakly dentate with 6–10 teeth up to 2 mm long. Inflorescences racemose, up to 70 mm long, with dense, clear, simple, biseriate or stellate hairs; bracts lanceolate-ovate, 0.4–1 mm long, 0.4–0.8 mm wide, with dense, clear stellate hairs. Male flowers 1–5 per bract; pedicels 1.2–3 mm long, 0.4–0.8 mm diameter, with dense, clear stellate hairs; calyx 3 or 4–lobed, lobes obovate, 1.5–3 mm long, 1.4–2.6 mm long, with dense, clear stellate hairs and scattered yellow, sessile glands; disk glands absent; stamens 50–60; filaments fused at base for varying degrees, flattened, 0.5–1.2 mm long, c. 0.1 mm diameter, glabrous; anthers oblong, 0.5–0.6 mm long, 0.2–0.4 mm wide, with a well-developed orange glandular cap. Female flowers 1 per bract; pedicels 0.5–1 mm long, 0.5–0.8 mm diameter, with dense, clear stellate hairs and scattered orange, sessile glands; calyx 3 or 4–lobed, lobes lanceolate, 1-2 mm long, 0.5–1 mm wide, with dense, clear stellate hairs and scattered yellow, sessile glands; ovary 3–locular, subglobose, 1–2 mm long, 1.3–2.2 mm diameter, with dense, orange sessile glands, without echinate processes; styles 2 or 3, 1.2–2 mm long, connate at base for c. 0.4 mm, plumose, glabrous on backs. Fruits subglobose, possibly indehiscent, 4–8 mm long, 5.5–6 mm diameter, with dense, orange sessile glands. Seeds globose-ovoid, 3–4 mm long, 3–3.5 mm wide, 2.5–3 mm thick, tan-black. *Yellow ball flower* (Kenneally et al. 1996). Fig. 7.

***Selected additional specimens*: Western Australia.** Walcott Inlet, 16°27'S, 124°50'E, Jan 1989, *Hyland* 13829 (QRS); Gallery Hill area, Abydos/Woodstock Reserve, North Pilbara region, 21°48'S, 119°10'E, Mar 1988, *Tinley* 3239 (PERTH); Broome, Jetty Wharf road, Kimberley Region, 17°58'S, 122°13'E, May 1981, *Tracey* 15168 (BRI, QRS). **Northern Territory.** Nitmiluk, above visitor centre, Dec 1990, *Evans* 3493 (BRI, CANB, DNA); Wessel Islands, 11°11'S, 136°44'E, Sep 1972, *Latz* 3263 (BRI, DNA); Rangani Creek, Melville Island, 11°18'S, 130°31'E, Jun 1988, *Russell-Smith* 5755 & *Lucas* (BRI, DNA); Bathurst Island, Murrow Point, 11°23'S, 130°14'E, Jun 1988, *Russell-Smith* 5770 & *Lucas* (BRI, DNA); 10 km NW of mouth of Rosie Creek, 15°22'S, 136°06'E, Jan 1989, *Russell-Smith* 6764 & *Lucas* (BRI, DNA); Port Bradshaw, 12°27'S, 136°42'E, Jul 1948, *Specht* 736A (AD, BRI, CANB). **Queensland.** Cook District: S of Aurukun, 13°28'S, 141°37'E, Jul 1988, *Dalliston* CC415 (BRI); Newcastle Bay, headland between Narau & Nanthau beaches, 10°47'S, 142°35'E, Jan 1990, *Forster* PIF6384 (BRI, QRS); Lake Patricia, Weipa, 12°38'S, 141°49'E, Dec 1993, *Forster* PIF14406 (BRI); Southern end of Esplanade, Yorkeys Knob, Cairns, 16°49'S, 145°44'E, Jan 1987, *Lyons* 17 (BRI); Archer River, 13°26'S, 142°56'E, Jun 1989, *Sankowsky* 1002 et al. (BRI); Stanley Island, 14°09'S, 144°14'E, Aug 1979, *Smyth* [AQ412668] (BRI). Burke District: Woodu, between Nyuldorg & Thabugan Point, northern most coast of Mornington Island, Sep 1981, *Fosberg* 620087 (BRI); Between Tully & Massacre Inlets, Gulf of Carpentaria, 16°12'S, 138°10'E, Aug 1988, *Hyland* 13572 (QRS); Lawn Hill N.P., 18°42'S, 138°29'E, Jan 1989, *O'Keefe* [AQ454825] (BRI). North Kennedy District: Horseshoe Bay, Magnetic Island, 19°07'S, 146°52'E, Feb 1992, *Bean* 3932 (BRI); Emmett Creek, Bowling Green Bay N.P., 19°27'S, 147°03'E, Jan 1993, *Forster* PIF12741 & *Bean* (BRI, QRS).

***Distribution and habitat*:** *M. nesophilus* is widespread in tropical parts of Western Australia, the Northern Territory and Queensland (Map 7). Plants grow in vinethickets and vineforests often near the sea or sometimes inland for considerable distances in refugia in gorges and gullies.

***Phenology*:** Flowers and fruits throughout the year.

***Notes*:** A specimen of *Mallotus nesophilus* was incorrectly identified as *M. tiliifolius* by Airy Shaw (1981) resulting in the erroneous recording of that species for Australia.

The name *Echinus nesophilus* requires lectotypification as there are many original syntypes. The best of these syntypes is the one collected by *Henne* and this is selected as

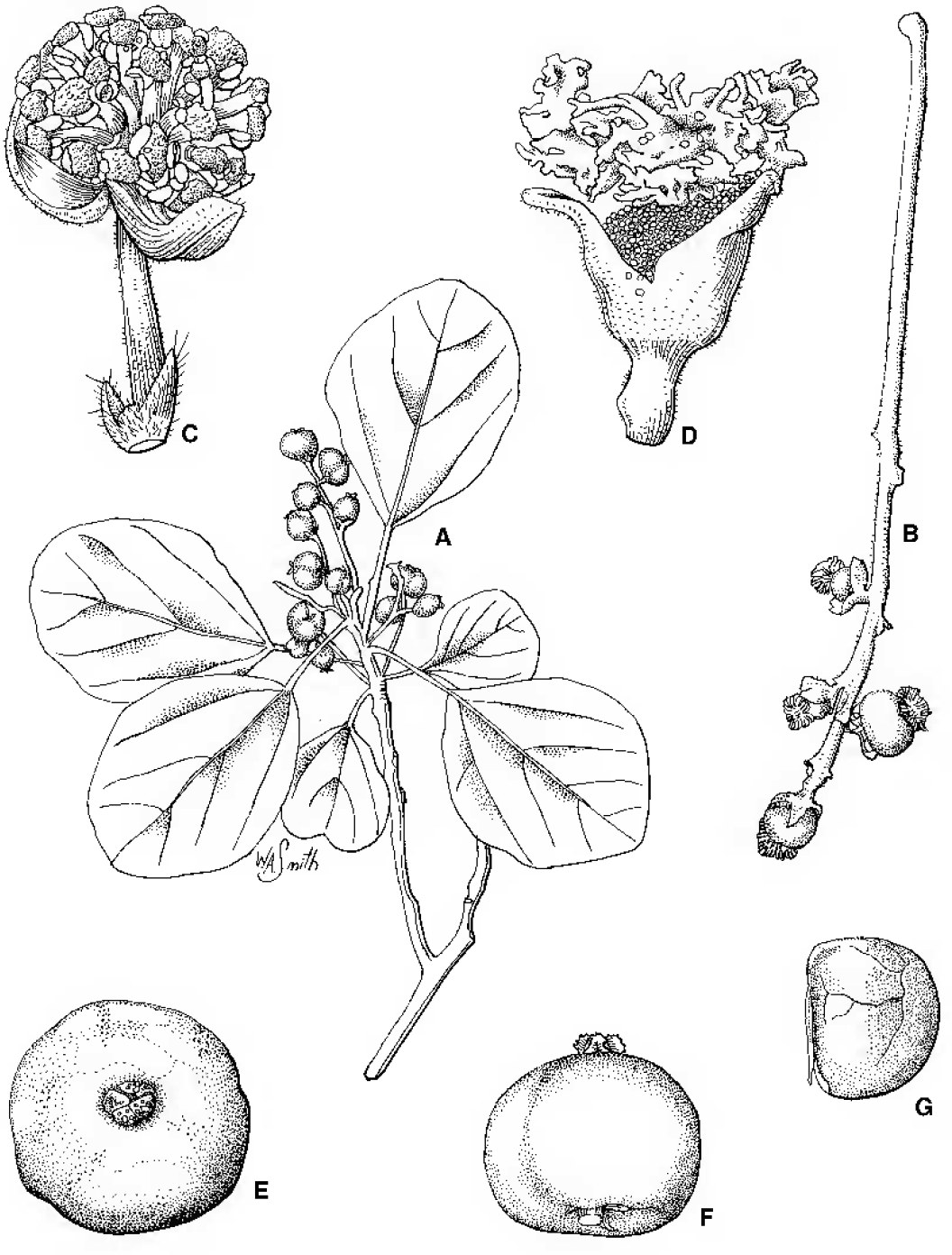



**Fig. 7.** ***Mallotus nesophilus*** A. fruiting twig. x 1. B. inflorescence. x 2. C. male flower. x 12. D. female flower. x 12. E & F. fruit. x 3. G. seed. x 6. A from *Cowie* 3139 (BRI); B from *Forster* 20899 (BRI); C from *O'Reilly* 411 (BRI); D from *Russell-Smith* 5770 (BRI); E-G from *Lyons* 517 (BRI). Del. W. Smith.

lectotype of the name.

*Mallotus nesophilus* is quite variable in terms of its leaf morphology and indumentum density. Plants from windswept coastal locations tend to have smaller leaves with shorter and denser coverage of trichomes, whereas plants from some inland localities may have relatively few trichomes on the lower leaf surface.

***Conservation status*:** Widespread. Not endangered or rare.

***Etymology*:** The specific epithet is derived from the Greek *neso* (island) and *philus* (loving) and refers to many of the syntypes having been collected from islands.

***Uses*:** The fruit are edible (Kenneally et al. 1996).

**8. Mallotus paniculatus** (Lam.) Muell.Arg., Linnaea 34: 189 (1865); *Croton paniculatus* Lam., Encycl. Méth., Bot. 2: 207 (1786). **Type:** Java, *Commerson* (holo: P-JU 16579 n.v. [fiche at BRI]).

*Mallotus cochinchinensis* Lour., Fl. Cochinch. 635 (1790). **Type:** 'Habitat sepes, et hortos minus cultos Cochinchinae, & Chinae', *Loureiro* (holo: BM n.v. [photo at BRI]).

***Illustration*:** Christophel & Hyland (1993: 109, t. 47C).

Shrub or small tree to 6 m high; evergreen, perennial, monoecious or often functionally dioecious. Stems ± rounded towards apices, with dense, clear to ginger to silver stellate hairs when young often appearing almost peltate, becoming sparse with age. Stipules acute-lanceolate, 0.5–1 m long, 0.4–0.5 mm wide, with dense ginger to silver ±peltate hairs. Leaves alternate, not peltate, petiolate, discolorous; petioles 30–180 mm long, 1.5–2 mm diameter, with dense, ginger to silver, stellate hairs; basilaminar glands one per side of midrib at lamina base, ellipsoid, 1–2.8 mm long, 0.6–1.8 mm wide; lamina broadly ovate, rhombic-ovate, 40–190 mm long, 22–120 mm wide; venation palminerved, 3–5 lateral veins from the lamina base, an additional 6–8 lateral veins further up the midrib and with reticulate interlateral veins; upper surface matt dark-green, lateral veins just visible, interlateral veins not visible, without granular inclusions, with dense, ginger to silver stellate hairs, glabrescent; lower surface silver-white, lateral and interlateral venation well developed, with dense, ginger to silver stellate hairs, yellow sessile glands generally absent, indumentum persistent; tip short or long acuminate; base cuneate to truncate; margins generally entire, weakly sinuate, or very weakly dentate with poorly defined teeth. Inflorescences paniculate, up to 300 mm long, with dense, ginger to silver, stellate hairs; bracts lanceolate to lanceolate-ovate, 1–3 mm long, 0.4–0.8 mm wide, with dense, ginger to silver stellate hairs. Male flowers 1–5 per bract; pedicels 3–5 mm long, 0.5–0.6 mm diameter, with dense, ginger to silver stellate hairs; calyx 3- or 4-lobed, lobes lanceolate-ovate or obovate, 2.2–3 mm long, 1.5–2.3 mm long, with dense, silver stellate hairs; disk glands absent; stamens 44–56; filaments free, filiform, 2.5–3.2 mm long, c. 0.1 mm diameter, glabrous; anthers oblong, c. 0.3 mm long and 0.4 mm wide, glandular cap absent. Female flowers 1 per bract; pedicels 0.7–1.9 mm long, 0.5–1 mm diameter, with dense, silver, stellate hairs; calyx 4-lobed, lobes lanceolate-ovate, 1.5–2.7 mm long, 1–1.7 mm wide, with dense, silver, stellate hairs; ovary 3-locular, subglobose, 1.2–1.5 mm long, 1.8-2 mm diameter, with dense, stellate hairs, echinate processes simple and up to 0.6 mm long; styles 3, 1.5–2 mm long, barely connate at base, plumose, with dense peltate hairs on backs. Fruits subglobose, 4–5 mm long, 5–6 mm diameter, with sparse ginger to silver, stellate hairs and echinate processes 3–4 mm long. Seeds ±globose, 3–3.5 mm long, 3–3.2 mm wide, 2.5–2.8 mm thick, tan. Fig. 8.

***Selected additional specimens*: Queensland.** Cook District: Mowbray River, Jan 1932, *Brass* 1961 (BRI); West Claudie River, Iron Range N.P., 12°44'S, 143°14'E, May 1992, *Fell* DGF2609 & *Butcher* (BRI, DNA, QRS); Stoney Creek, Mission Beach - Tully road, 17°55'S, 146°05'E, Jul 1989, *Forster* PIF5617 (BRI, DNA, MEL); Turpentine road, Little Cooper Creek, Daintree Freehold Rainforest, 16°10'S, 145°24'E, Feb 1994, *Forster* PIF14724 (A, BRI, MEL, QRS); Mew River, 1 km SW of Muddy Bay, Cape York, 10°44'S, 142°32'E, Jun 1994, *Forster* PIF15302 & *Tucker* (BRI); Copper Lode Falls Dam site, on Freshwater Creek, c. 6 miles [10 km] S of Cairns, 16°56'S, 145°46'E, Aug 1970, *Gittins* 2137

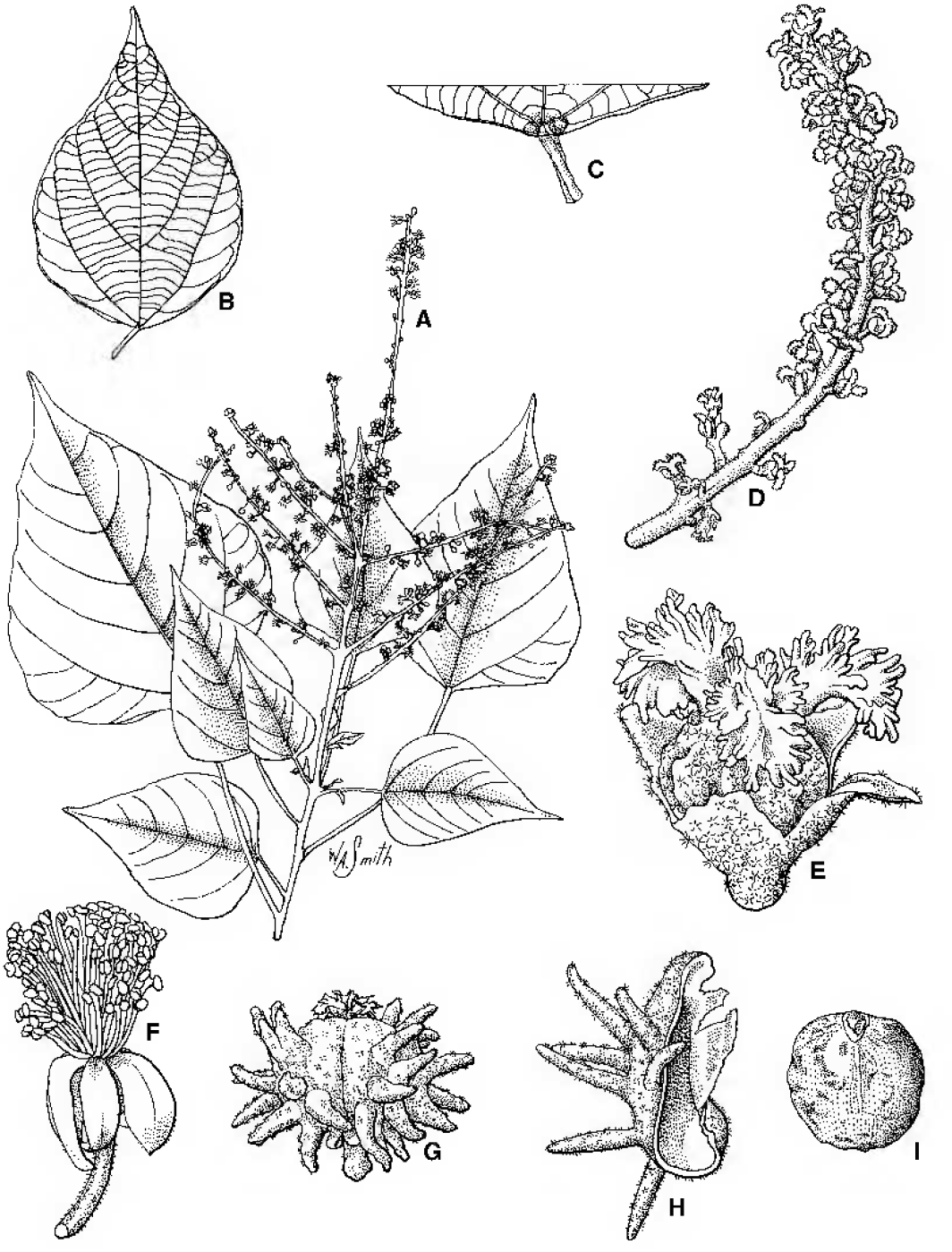



**Fig. 8.** ***Mallotus paniculatus***. A. flowering twig. x 0.4. B. undersurface of leaf. x 0.4. C. base of undersurface of leaf showing glands. x 0.8. D. inflorescence. x 1.5. E. female flower. x 12. F. male flower. x 6. G. fruit. x 3. H. part of dehisced fruit. x 6. I. seed. x 6. A from *Jago* 3744 (BRI); B-E from *Forster* 14323 (BRI); F-G from *Forster* 14724 (BRI), H-I from *Forster* 5617 (BRI). Del. W. Smith.

(BRI); S.F.R. 310 Parish of Gadgarra, 17°30'S, 145°41'E, Nov 1984, *Gray* 3672 (QRS); T.R. 55 Whyanbeel, 16°20'S, 145°20'E, *Hyland* 7746 (BRI, QRS); Between Lockerbie & Somerset, May 1981, *Hyland* 11062 (QRS); R1073, Rooty L.A., 16°40'S, 145°30'E, Mar 1976, *Hyland* RFK3394 (BRI, CANB, QRS); Wrights Creek, between Lakes Barrine & Eacham, Apr 1953, *Melville* 3699 *et al.* (BRI); Etty Bay, Dec 1941, *White* 11744 (BRI). North Kennedy District: Dunk Island, Dec 1907, *Banfield* [AQ203792] (BRI); Little Crystal Creek, E of Paluma, Feb 1992, *Bean* 3923 (BRI); Wongaling Beach road, Mission Beach, 17°53'S, 146°05'E, May 1989, *Bogenhuber* 59 (BRI); "The Gorge Range", Sword Creek falls, 18 km WNW of Abergowrie, 18°27'S, 145°42'E, Mar 1988, *Fell* DGF734 (BRI); Kirrama Range, 18.5 km from Kennedy, 18°12'S, 145°50'E, Dec 1993, *Forster* PIF14316 (BRI, QRS); Tully River valley, Cardstone road, 17°51'S, 145°43'E, Dec 1993, *Forster* PIF14323 (A, BRI, MEL, QRS). South Kennedy District: Dalrymple Heights & vicinity, Jul-Sep 1947, *Clemens* [AQ330649] (BRI); Mt Blackwood, Mar 1987, *Thompson* 68 (BRI).

***Distribution and habitat*:** *Mallotus paniculatus* is commonly found in Queensland in the Cook (southern parts), North and South Kennedy districts, with several disjunct populations on Cape York Peninsula and adjacent Torres Strait (Map 8). The species is widespread in Asia and Malesia. Plants grow on notophyll and mesophyll vineforest margins on a variety of soils of volcanic origin.

***Phenology*:** Flowers November to July; fruits througout the year.

***Notes*:** A specimen of this species from Prince of Wales Island was incorrectly identified as *Mallotus tiliifolius* by Airy Shaw (1981).

***Conservation status*:** Common in the area of occurrence. Not threatened.

***Etymology*:** The specific epithet is derived from Latin and probably pertains to the paniculate inflorescence of this species.

***Uses*:** None recorded. Probably useful as a pioneer species in rainforest rehabilitation projects.

**9. Mallotus philippensis** (Lam.) Muell.Arg., Linnaea 34: 196 (1865); *Croton philippense* Lam., Encycl. Méth., Bot. 2: 206 (1786); *Echinus philippensis* (Lam.) Baill., Adansonia 6: 314 (1866). **Type:** Philippines, *Sonnerat* (holo: P-JU 16581 n.v. [fiche at BRI]).

***Illustrations*:** Williams (1979: 185, 1987: 199); Brock (1988: 248); Floyd (1989: 152); Hauser (1992: 102); Christophel & Hyland (1993: 109, t. 47D).

Shrub or small tree to 10 m high; evergreen or fleetingly deciduous, perennial, dioecious. Stems ± rounded towards apices, with dense, ginger stellate hairs and red sessile glands, glabrescent and lenticellate with age. Stipules acuminate-lanceolate, 0.6–1 mm long, 0.3–0.8 mm wide, with dense, ginger stellate hairs. Leaves alternate, not peltate, petiolate, discolorous; petioles 15–80 mm long, 0.8–1 mm diameter, with dense, clear to ginger stellate to ± peltate hairs and scattered red sessile glands; basilaminar glands 1 per side of midrib towards lamina base, spherical, 0.3–0.5 mm wide; lamina elliptic, lanceolate-ovate or obovate, 15–200 mm long, 8–100 mm wide; palminerved, comprising 2 prominent lateral veins from the lamina base, 5–7 lateral veins further along the midrib and reticulate interlateral veins; upper surface glossy dark-green, lateral and interlateral veins just visible, without granular inclusions, with sparse clear stellate hairs when young, glabrescent; lower surface grey-silver to reddish-silver, lateral and interlateral venation well developed, with dense clear simple hairs overtopping dense clear peltate scales and dense red sessile glands, indumentum persistent; tip acute, short acuminate or obtuse; base cuneate, rounded or truncate; margins generally entire or weakly sinuate; Inflorescences racemose or with 1 or 2 side branches, but not paniculate, up to 110 mm long, with dense, clear to ginger stellate hairs and scattered red sessile glands; bracts lanceolate-triangular, 0.5–1.2 mm long, 0.6–1 mm wide, with dense, ginger stellate hairs and scattered red sessile glands. Male flowers 1–3 per bract; pedicels 2–3.5 mm long, 0.3– 0.4 mm diameter, with dense, clear stellate hairs and scattered red sessile glands; calyx 3- or 4-lobed, lobes lanceolate-ovate to obovate, 2.5–2.8 mm long, 0.7–2.5 mm long, with dense, clear stellate hairs and scattered, red sessile glands; disk glands absent; stamens 20–28, free; filaments filiform, 0.5–1.5 mm long, c. 0.1 mm diameter,

glabrous; anthers oblong, 0.5–0.8 mm long, 0.5–0.7 mm wide, with a few orange-red sessile terminal glands. Female flowers 1 per bract; pedicels 0.4–2 mm long, 0.4–0.6 mm diameter, with dense, ginger stellate hairs; calyx 4-lobed, lobes lanceolate, 1.2–1.8 mm long, 0.5–0.6 mm wide, with dense, ginger stellate hairs and scattered red sessile glands; ovary 3-locular, subglobose, 1–1.5 mm long, 1.2–1.8 mm diameter, with dense, ginger stellate hairs and scattered, red sessile glands, lacking echinate processes; styles 3, 1.8–3 mm long, connate at base for 0.3–0.5 mm, plumose, with sparse ginger stellate hairs and dense red sessile glands on backs. Fruits depressed-globose, 4–7.5 mm long, 7–12 mm diameter, always with dense red sessile glands and occasionally with yellow stellate hairs. Seeds globose-ovoid, 3–5 mm long, 3–5 mm wide, 2.8–4.5 mm thick, black. *Red kamala, Orange kamala.*

***Selected additional specimens*: Northern Territory.** Wagait Reserve, 13°12'S, 130°40'E, Jan 1973, *Dunlop* 3106 (BRI, DNA); Source of Glasswater Creek, Litchfield, 13°20'S, 130°33'E, Oct 1988, *Russell-Smith* 5990 & *Lucas* (BRI, DNA). **Queensland.** Cook District: Mt Scatterbrain, Butchers Hill Station near Lakeland Downs, 15°52'S, 144°53'E, Jan 1992, *Forster* PIF9520 (BRI, DNA, K, L, MEL, QRS); Boat ramp area, Rocky Point, Weipa, 12°37'S, 141°53'E, Nov 1989, *O'Reilly* 456 (BRI, QRS). North Kennedy District: S.F. 387, 2 km SSW of dam wall on Proserpine River, 20°23'S, 148°22'E, May 1991, *Forster* PIF8316 & *McDonald* (BRI); Creek between Frederick Peak & South Pinnacle, 19°23'S, 146°38'E, Jan 1992, *Forster* PIF9467 & *Bean* (BRI, K, L, MEL, QRS). South Kennedy District: Lindeman Island, Coconut Bay, Nov 1985, *Batianoff* 3294 & *Dalliston* (BRI); Dalrymple Heights & vicinity, Jul-Nov 1947, *Clemens* [AQ198249] (BRI). Leichhardt District: Carnarvon Gorge, Jan 1989, *Morley* 16 (BRI); Isla Gorge, c. 28 km SW of Theodore, Aug 1973, *Sharpe* 623 & *Hockings* (BRI). Port Curtis District: Lower reaches of Koolkoorum Creek, S.F. 121, 24°26'S, 151°13'E, Oct 1989, *Forster* PIF5868 et al. (BRI, MEL, NSW); 25 km SW of Raglan, R146, Horrigan Creek, 23°43'S, 150°48'E, Mar 1989, *Gibson* TOI490 (BRI); Mt Larcom Range, 6 km NW of Yarwun, 23°48'S, 151°06'E, Aug 1989, *Gibson* TOI805 (BRI). Burnett District: Cania Gorge N.P., 24°42'S, 150°58'E, Oct 1983, *Henderson* 2982 et al. (BRI). Wide Bay District: Stony Creek, 4 km E of Didcot, 25°29'S, 151°54'E, Oct 1990, *Forster* PIF7529 (BRI, K, L, QRS); Mt Glastonbury, S.F. 242 Glastonbury, 26°14'S, 152°27'E, Dec 1991, *Forster* PIF9297 & *Tucker* (A, BRI, K, L, MEL, QRS). Moreton District: Currumbin Creek, Jan 1970, *Dunlop* 1607 (BRI, CBG); Upper Brookfield, Brisbane, Feb 1978, *Jessup* 54 (BRI). **New South Wales.** Whian Whian road, 1.3 km from junction of road to Whian Whian S.F., 28°39'S, 153°20'E, Dec 1986, *Murray* 78 et al. (BRI, NSW).

***Distribution and habitat*:** *Mallotus philippensis* has a wide distribution in Australia occurring in the northern part of the Northern Territory and in Cook, North Kennedy, South Kennedy, Port Curtis, Leichhardt, Burnett, Wide Bay and Moreton botanical districts in Queensland and in north-east New South Wales (Map 9). The species is also widespread in Malesia and parts of Asia. Plants grow mainly in microphyll to notophyll vineforests and vinethickets, but are frequently found in gullies or on ridges in open forest especially at rocky sites with some fire protection.

***Phenology*:** Flowers and fruits throughout the year.

***Notes*:** *Mallotus philippensis* is unique amongst the Australian species of *Mallotus* in having red sessile glands and the lower leaf lamina with persistent, ± stellate scales.

***Conservation status*:** *Mallotus philippensis* is a very common plant and is present in at least 28 conservation reserves in south-east Queensland alone (Forster et al. 1991).

***Etymology*:** The specific epithet refers to this plant having been described from a collection obtained in The Philippines.

***Uses*:** The red covering on the fruits is used to dye silk in India. The wood is suitable for tool handles and building (Floyd 1989).

**10. Mallotus polyadenos** F.Muell., Fragm., 6: 184 (1868). **Type:** Queensland. Cook District: Sea View Range, 11 November 1864 [*Dallachy* s.n.] (lecto [here designated]: MEL [MEL708712]).

***Illustration*:** Christophel & Hyland (1993: 109, t. 47E).

Shrub or small tree to 10 m high; evergreen, perennial, monoecious, but often functionally dioecious. Stems ± flattened towards apices, with sparse yellow to red sessile glands. Stipules acute-lanceolate, 0.8–1 mm long, 0.5–0.6 mm wide, with sparse yellow sessile glands. Leaves opposite, not peltate, petiolate,

discolorous; petioles 3–47 mm long, 0.5–1 mm diameter, with sparse to dense, yellow sessile glands; basilaminar glands 1 per side of midrib near lamina base, ellipsoid, 0.7–1 mm long, 0.5–0.7 mm wide; lamina elliptic, oblanceolate or obovate, 36–200 mm long, 15–90 mm wide; penninerved, comprising 8–12 lateral veins per side of midrib and reticulate interlateral veins; upper surface glossy dark-green, lateral and interlateral veins not visible, with sparse included granular inclusions, glabrous; lower surface pale green, lateral and interlateral venation well developed, glabrous and with dense, yellow sessile glands, occasionally also with small clumps of simple hairs forming domatia in vein angles; tip acute, short acuminate or obtuse; base cordate to cuneate; margins generally entire, but sometime weakly sinuate. Inflorescences racemose, up to 150 mm long, with scattered yellow to ginger stellate hairs and sparse yellow sessile glands; bracts triangular, c. 1 mm long, 0.6–0.8 mm wide, with an occasional simple hair and sparse yellow sessile glands. Male flowers 1–10 per bract; pedicels 2–4.5 mm long, 0.5–0.7 mm diameter, with dense, yellow stellate hairs; calyx 3 or 4-lobed, lobes oblanceolate to obovate, 3–3.5 mm long, 1.4–2.8 mm long, with scattered to sparse, yellow sessile glands; disk glands absent; stamens 38–70, free; filaments filiform, 1.5–2.7 mm long, c. 0.1 mm diameter, glabrous; anthers oblong, 0.6–0.8 mm long, 0.8–1 mm wide, glandular cap absent. Female flowers 1 per bract; pedicels 1.8–12 mm long, 0.4–0.8 mm diameter, with scattered, ginger stellate hairs and sparse yellow sessile glands; calyx 4-lobed, lobes lanceolate, 1.5–2.6 mm long, 0.6–1.2 mm wide, with sparse yellow to red sessile glands; ovary 3-locular, depressed-globose, 1–2.6 mm long, 1.5–4 mm diameter, with dense, yellow sessile glands, without echinate processes; styles 3, 1.8–3 mm long, barely connate at base for 0.2–0.3 mm, plumose, with sparse yellow sessile glands on backs. Fruits depressed-globose, 5–6 mm long, 8–10 mm diameter, with sparse, yellow sessile glands, without echinate processes. Seeds globose-ovoid, 3.3–4.5 mm long, 3–3.5 mm wide, 3.5–4 mm thick, tan-brown. Fig. 9.

***Selected additional specimens*: Queensland.** Cook District: Lower reaches of Isabella Creek, NW of Cooktown, 15°22'S, 145°00'E, Jul 1990, *Bean* 1999 (BRI); Maloney's Springs, left branch, 12°27'S, 142°53'E, Jun 1989, *Forster* PIF5272 (BRI); Nesbit River, 13°32'S, 143°32'E, Jun 1992, *Forster* PIF10528 et al. (BRI, QRS); 13.5 km along Goldsborough road, 17°14'S, 145°46'E, Jan 1993, *Forster* PIF13090 & *Bean* (BRI, MEL, QRS); Wyvuri Holding, 17°20'S, 145°58'E, Oct 1978, *Gray* 1046 (BRI, MEL, QRS); S.F.R. 1073, Buchan L.A., 16°46'S, 145°37'E, Jan 1979, *Gray* 1254 (BRI, MEL, QRS); Normanby River, N of Kalpowar, 14°40'S, 144°10'E, Oct 1970, *Hyland* 4860 (BRI, QRS); Claudie River, 12°45'S, 143°15'E, Oct 1972, *Hyland* 6458 (BRI, QRS); Between Lockerbie & Somerset, 10°47'S, 142°30'E, Dec 1980, *Hyland* 10955 (QRS); Eliott Falls, Jardine River, 11°09'S, 141°30'E, Oct 1989, *O'Reilly* 542 (BRI); Wenlock River, southern bank at Moreton Telegraph Station, 12°27'S, 142°38'E, Oct 1989, *Neldner* 2807 & *Clarkson* (BRI, MBA, QRS); 4 km S of the track to Mission River along the boundary fence between Batavia Downs & Mission River, 12°35'S, 142°32'E, Nov 1989, *Neldner* 2856 & *Clarkson* (BRI, DNA, MBA, QRS); 25 km ENE of Weipa Mission, 12°41'S, 142°07'E, Dec 1974, *Specht* W219 & *Salt* (BRI); Headwaters of Lankelly Creek on western fall of McIlwraith Range, 13°52'S, 143°20'E, Oct 1969, *Webb* & *Tracey* 9620A (BRI). North Kennedy District: 18 km WSW of Abergowrie, Sword Creek Falls N.P., Gorge Range, 18°27'S, 145°42'E, Mar 1988, *Fell* DGF739 (BRI); Emmett Creek, Bowling Green Bay N.P., 19°27'S, 147°03'E, Dec 1993, *Forster* PIF14306 (BRI, QRS); Tully Falls, 17°46'S, 145°33'E, Dec 1993, *Forster* PIF14334 (BRI, QRS); Impulse Creek, Conway Forest, 20°30'S, 148°50'E, Nov 1986, *Perry* [AQ431860] (BRI); c. 13 km WNW of Cardwell, 18°14'S, 145°54'E, Oct 1976, *Thorsborne* 295 & *Thorsborne* (BRI); Brandy Creek road, c. 3.6 km E of Shute Harbour Road & 13 km NE of Proserpine, 20°21'S, 148°40'E, Nov 1985, *Sharpe* 4052 & *Perry* (BRI).

***Distribution and habitat*:** In Australia *Mallotus polyadenos* is found in the Cook and North Kennedy botanical districts (Map 2). The species is also found in New Guinea. Plants grow in semi-evergreen to evergreen notophyll vineforests near permanent or seasonal watercourses.

***Phenology*:** Flowers and fruits throughout the year.

***Notes*:** There are numerous specimens at MEL collected by Dallachy that may be syntypes of this name. I have chosen a specimen (MEL708712) that was collected prior to the publication of the name and is copiously annotated by Mueller.

***Conservation status*:** Widespread and

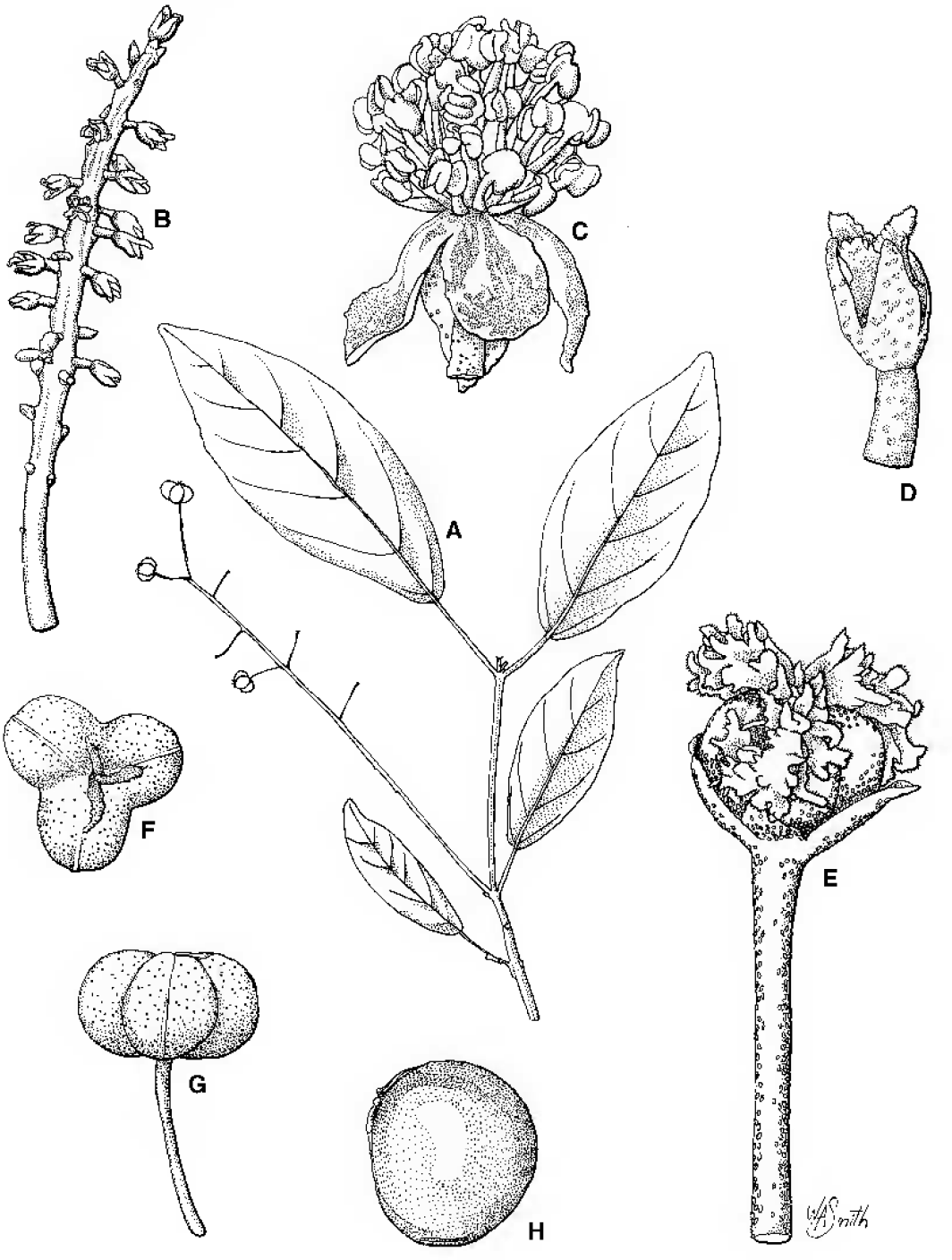



**Fig. 9.** ***Mallotus polyadenos***. A. fruiting twig. x 0.5. B. inflorescence. x 2. C. male flower. x 8. D. young female flower. x 8. E. older female flower. x 8. F. & G. fruit. x 3. H. seed. x 6. A, F-H from *Forster* 13090 (BRI); B-D. from *Neldner* 2856 (BRI); E from *Halford* Q735 (BRI). Del. W. Smith.

common. Not endangered or rare.

***Etymology*:** The specific epithet is derived from the Greek *poly* (many) and *odenos* (glands).

***Uses*:** None recorded.

**11. Mallotus repandus** (Willd.) Muell.Arg., Linnaea 34: 197 (1865); *Croton repandus* Willd., Neue Schrift. Naturf. Freunde Berlin 4: 206 (1803). **Type:** S India, *Klein* (holo: B n.v. [destroyed]).

Scrambling woody liane up to 20 m long; evergreen, perennial, monoecious. Stems ± rounded towards apices, with dense, clear stellate hairs and scattered yellow sessile glands when young, glabrescent. Stipules acute-lanceolate, 0.3–0.5 mm long, 0.2–0.3 mm wide, with dense yellow stellate hairs. Leaves alternate, not peltate, petiolate, discolorous; petioles 10–82 mm long, 0.6–1 mm diameter, with dense, yellow simple, biseriate and/or stellate hairs; basilaminar glands 1 or 2 per side of midrib near lamina base, ellipsoid, 0.3–0.4 mm long, 0.2–0.3 mm wide; lamina elliptic, broadly-ovate, ovate, 22–120 mm long, 15–90 mm wide; palminerved, comprising 2–4 lateral veins from base, 3–5 lateral veins further up midrib and reticulate interlateral veins; upper surface matt dark-green, lateral and interlateral veins just visible, without granular inclusions, glabrous, with dense, clear stellate hairs when young, becoming scattered with age; lower surface pale green to green-yellow, lateral and interlateral venation well developed, with dense, clear stellate hairs and scattered to sparse yellow sessile glands when young, becoming scattered with age; tip acute, short to long acuminate; base attenuate, weakly cordate, cuneate, rounded, truncate; margins sinuate to weakly dentate with up to 8 poorly developed teeth to 2 mm long. Inflorescences racemose or with 1 or 2 side branches, not paniculate, up to 180 mm long, with dense, clear stellate hairs; bracts lanceolate, c. 1 mm long and 0.3 mm wide, with dense, clear stellate hairs. Male flowers 1–10 per bract; pedicels 4–8 mm long, 0.5–0.8 mm diameter, with dense, yellow stellate hairs; calyx 3 or 4-lobed, lobes lanceolate-ovate to obovate, 2.5–4 mm long, 1.3–3.8 mm long, with dense, yellow stellate hairs and scattered yellow sessile glands; disk glands absent; stamens 74–88, free; filaments filiform, 2–2.5 mm long, c. 0.1 mm diameter, glabrous; anthers oblong, 0.5–0.6 mm long, 0.5–0.6 mm wide, glabrous, glandular cap absent. Female flowers 1 per bract; pedicels 1–8 mm long, 0.8–1 mm diameter, with dense, yellow stellate hairs; calyx 4-lobed, lobes lanceolate, 1.2–2.2 mm long, 0.6–0.9 mm wide, with dense, yellow stellate hairs; ovary 2-locular, subglobose, 1–3.8 mm long, 1.8–4 mm diameter, with dense, yellow stellate hairs, without echinate processes; styles 2, 1.8–4 mm long, connate at base for 0.5–0.8 mm, plumose, with dense yellow stellate hairs and scattered yellow sessile glands on backs. Fruits subglobose, 8–9 mm long, 11–15 mm diameter, with dense, yellow stellate hairs; without echinate processes. Seeds ovoid, 5–5.5 mm long, 4.5–5 mm wide, 4.5–5 mm thick, brown. Fig. 10.

***Selected additional specimens*: Queensland.** Coconut Bay, Lizard Island, 14°40'S, 145°28'E, Jul 1990, *Batianoff* 12223 (BRI); Kamerunga, Cairns, *Cowley* [AQ203989] (BRI); Claudie River, 12°45'S, 143°15'E, Oct 1972, *Dockrill* 547 (BRI, QRS); Lake Euramo, Oct 1976, *Dockrill* 1302 (BRI, CANB, QRS); 15 km along Ellison Beach, Oct 1937, *Flecker* N.Q.N.C. 3942 (QRS); Goldsborough road, 17°14'S, 145°46'E, Jan 1993, *Forster* PIF13091 & *Bean* (BRI, MEL, QRS); Isabella Falls area, McKinnon Creek, 4 km W of Edmonton, 17°02'S, 145°43'E, Jan 1993, *Forster* PIF13095 & *Bean* (BRI, MEL, QRS); Lamond Hill, Iron Range, 12°43'S, 143°17'E, Jul 1993, *Forster* PIF13581 et al. (BRI); Little Mulgrave River, 1 km below Gillies Highway Crossing, 17°08'S, 145°44'E, Sep 1989, *Gray* 5098 (QRS); Danbulla, c. 19 miles [31.7 km] SW of Cairns, 17°09'S, 145°43'E, Jul 1966, *Hyland* [AQ203990] (BRI); Scenic Reserve 440, Lake Euramo, 17°10'S, 145°40'E, Dec 1971, *Hyland* 5735 (BRI, QRS); S.F.R. 310, Goldsborough L.A., 17°15'S, 145°45'E, Jan 1978, *Hyland* 9632 (QRS); Cairns, Oct 1896, *Nugent* 20 (BRI); Long Scrub, Bamaga, 1962, *Webb & Tracey* 6936 (BRI); Galloways Creek, Bamaga, 1962, *Webb & Tracey* 7161 (BRI); Bloomfield River, *Webb & Tracey* 7733 (BRI); Shipton's Flat between Rossville & Mt Finnegan, 15°47'S, 145°14'E, May 1969, *Webb & Tracey* 9042 (BRI). Port Curtis District: S.F. 86, Eurimbula, 24°10'S, 151°50'E, Dec 1970, *Webb & Tracey* 10405 (BRI). Moreton District: Mt Eerwah, c. 4 km W of Eumundi, 26°29'S, 152°55'E, Dec 1987, *Sharpe* 4632 (BRI); cult. Coolum Beach (ex Mt Eerwah), Nov 1988, *Sharpe* 4750 (BRI).

***Distribution and habitat*:** In Australia *Mallotus repandus* occurs in the Cook, Port Curtis and Moreton districts of Queensland (Map 11). The southern populations are highly

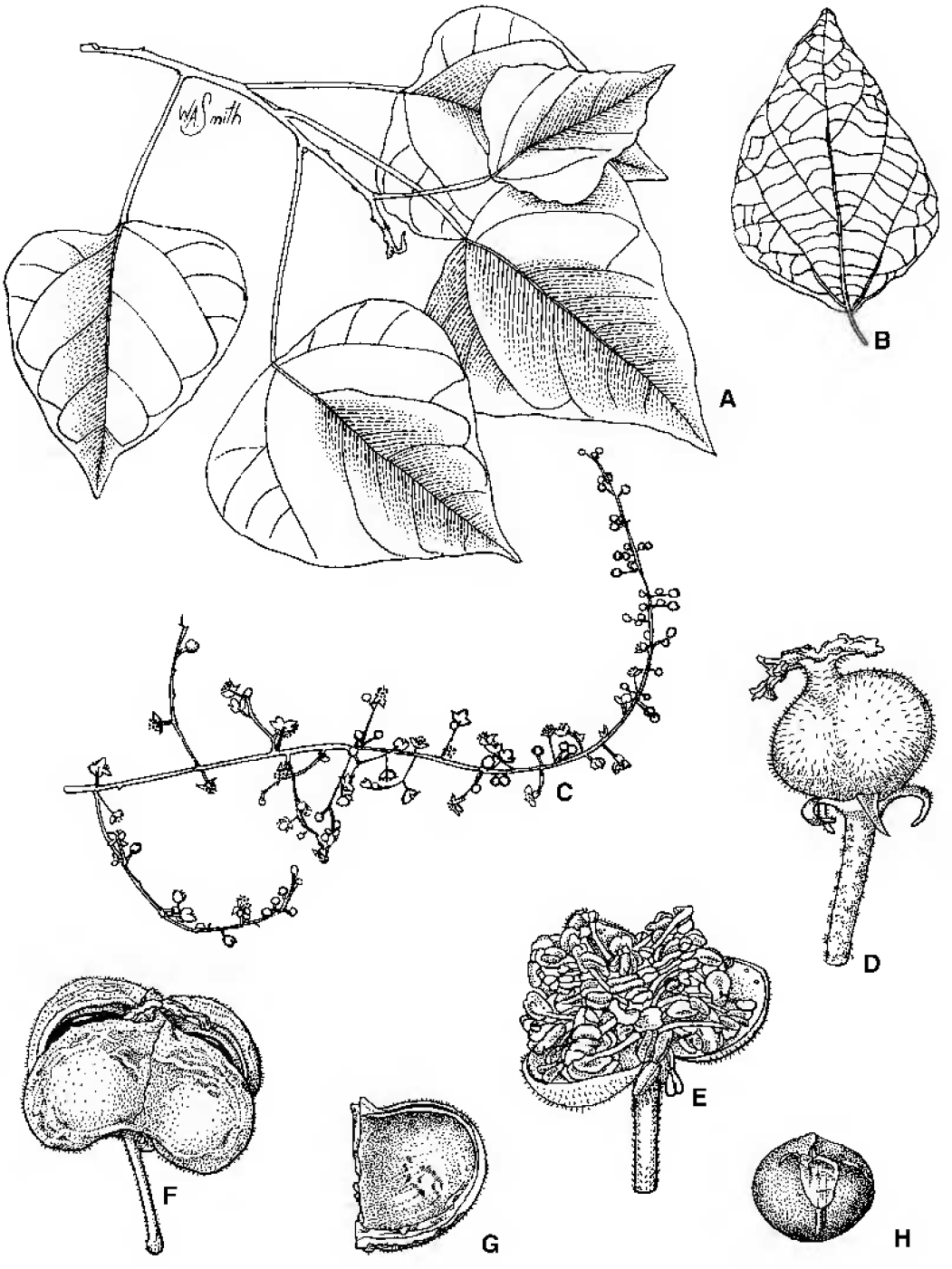



**Fig. 10.** ***Mallotus repandus***. A. twig. x 0.6. B. undersurface of leaf. x 0.6. D. female flower. x 4. E. male flower. x 6. F. fruit. x 3. G. section of dehisced fruit. x 3. H. seed. x 3. A, F, G, H from *Hyland* 9632 (QRS); B & C from *Forster* 18211 (BRI); E from *Gray* 5098 (QRS). Del. W. Smith.

disjunct. The species is also widespread in Malesia and Asia (Airy Shaw 1971, 1980c). Plants grow in notophyll vineforest on volcanic substrates.

***Phenology*:** Fertile collections are rare; however, flowering and fruiting probably occurs throughout the year.

***Notes*:** I have not been able to locate type material of this species; however, there seems little doubt as to the application of the name. A neotype from Indian material should be selected by a worker familiar with the genus in that area.

Airy Shaw (1981) noted that this species had been found near Bowen and Proserpine, but I have seen no specimens to confirm this.

***Etymology*:** The specific epithet is derived from Latin and refers to the sinuate leaf lamina margins.

***Uses*:** None recorded.

**12. Mallotus resinosus** (Blanco) Merr., Sp. Blanco. 222 (1918); *Adelia resinosa* Blanco, Fl. Filip. ed. 2: 562 (1845). **Type:** Philippines. Luzon: Batangas Province, Aug 1914, *Merrill* Species Blancoanae 485 (neo: US n.v., *fide* Merrill (1918: 222)).

*Mallotus walkerae* Hook.f., Fl. Brit. India 5: 437 (1887); *M. muricatus* var. *walkerae* (Hook.f) Pax & K.Hoffm. in Engl., Natur. Pflanzenfam. 7: 190 (1914). **Type:** Ceylon [Sri Lanka], *Walker* (holo: K n.v. [photo at BRI]).

Shrub or small tree to 5 m high; evergreen, perennial, dioecious. Stems ± rounded towards apices, with sparse, clear simple hairs and sparse yellow sessile glands when young, glabrescent with age. Stipules lanceolate, 2.2–4 mm long, 1.2–2 mm wide, with scattered, clear simple hairs. Leaves opposite, not peltate, petiolate, discolorous; petioles 1–15 mm long, 1.5–1.7 mm diameter, with sparse, clear simple hairs and sparse, yellow sessile glands; basilaminar glands 1 or 2 per side of midrib towards lamina base, ellipsoid, 0.5–1.2 mm long, 0.5–0.6 mm wide; lamina elliptic to obovate, 30–210 mm long, 15–110 mm wide; penninerved, comprising 11–12 lateral veins per side of midrib and reticulate interlateral veins; upper surface glossy dark-green, lateral and interlateral veins not visible, without granular inclusions, glabrous, with scattered, yellow sessile glands; lower surface pale green, lateral and interlateral venation well developed, glabrous, with sparse to dense yellow sessile glands; tip acute to short acuminate; base attenuate to cuneate; margins dentate with 8–14 teeth up to 3 mm long. Inflorescences racemose, up to 50 mm long, with sparse to dense, ginger simple, biseriate or rarely stellate hairs and dense yellow sessile glands; bracts triangular, 1.5–2.2 mm long, 1–1.2 mm wide, with sparse, clear simple hairs. Male flowers 1–3 per bract; pedicels 3–4.5 mm long, c. 0.4 mm diameter, with scattered to sparse, simple and/or biseriate hairs and scattered yellow sessile glands; calyx 2, 3 or 4-lobed, lobes obovate, 2.5–3 mm long, 1.2–2.4 mm long, with scattered, simple hairs and scattered yellow sessile glands; disk glands absent; stamens 26–48, free; filaments filiform, 2–3 mm long, c. 0.2 mm diameter, glabrous; anthers oblong, 0.5–0.6 mm long, 0.6–0.7 mm wide, glabrous, glandular cap absent. Female flowers 1 per bract; pedicels 1.5–5 mm long, 0.8–1 mm diameter, with sparse to dense, clear, simple and/or biseriate hairs and dense yellow sessile glands; calyx 4-lobed, lobes lanceolate, 2.8–3 mm long, 0.7–0.8 mm wide, with sparse simple hairs; ovary 3-locular, depressed-globose, c. 1.3 mm long, 1.8–2 mm diameter, with scattered, yellow stellate hairs, with dense, yellow sessile glands, with sparse echinate processes 0.5–1 mm long; styles 3, 2.6–3 mm long, connate at base for 0.7–1 mm, plumose, with scattered, yellow stellate hairs and scattered to sparse, yellow sessile glands on backs. Fruits depressed-globose, 5–7 mm long, 10-12 mm diameter, with scattered, yellow stellate hairs, with dense, yellow sessile glands and dense echinate processes 1.5–2 mm long. Seeds ovoid, c. 5 mm long, 4.5 mm wide, 4 mm thick, tan-brown. Fig. 11.

***Selected additional specimens*: Queensland.** Cook District: Park Ranger Station, Claudie River, 12°36'S, 143°17'E, *Fell* DGF2089 (BRI); SE edge of Mt Cook, N.P. 142, on Quarantine Bay side, 15°29'S, 145°16'E, Feb 1992, *Fell* DGF2423 & *Jensen* (BRI); Mt Webb N.P., 15°04'S, 145°07'E, Dec 1992, *Fell* DGF2792 & *Stanton* (BRI, MEL, QRS), ditto, DGF2802 (BRI, MBA, QRS); Near Ginger Mick's Mine, 2 km S of

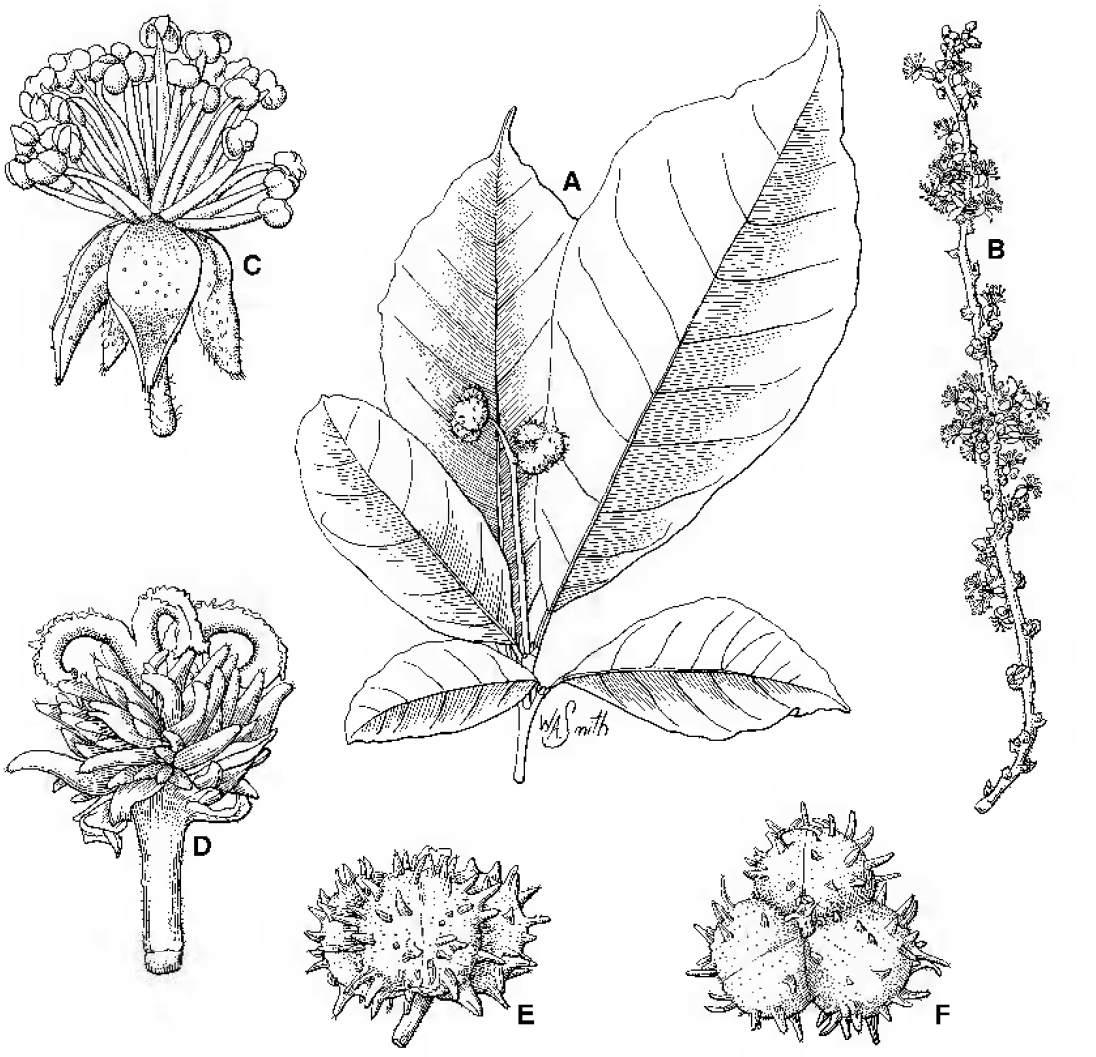



**Fig. 11.** ***Mallotus resinosus***. A. fruiting twig. x 0.5. B. inflorescence with male flowers. x 1. C. male flower. x 8. D. female flower. x 6. E & F. fruit. x 2. A, E & F from *Forster* 9527 (BRI); B & C. from *Forster* 14426 (BRI); D from *Hyland* 12443 (BRI). Del. W. Smith.

Punsand Bay, 10°44'S, 142°28'E, Feb 1990, *Forster* PIF6401 (BRI, DNA, QRS); Shiptons Flat, 10.5 km S of the Lions Den Hotel, Helenvale, 15°47'S, 145°14'E, Jan 1992, *Forster* PIF9527 (A, BRI, DNA, K, L, MEL, QRS); Round Mt, Embley Range, 13°33'S, 143°30'E, Jun 1992, *Forster* PIF10476 & *Tucker* (BRI, QRS); 1 km SE of the Twin Forks, headwaters of the Annan River, 15°49'S, 145°14'E, Jun 1992, *Forster* PIF10740 et al. (BRI, L, MEL, QRS); Shiptons Flat, 11.5 km from Lions Den Hotel, 15°47'S, 145°14'E, Dec 1993, *Forster* PIF14426 (A, BRI, MEL, QRS); Mt Augustus, Moa Island, 10°10'S, 142°18'E, Feb 1989, *Gray* 5003 (QRS); Altanmoui, 14°35'S, 144°35'E, Jul 1972, *Hyland* 6348 (BRI, QRS); Shiptons Flat on Tin Mine road, 15°45'S, 145°10'E, May 1969, *Smith* 14366 (BRI); Upper Cameron Creek, NW of Cooktown, 15°22'S, 145°07'E, Jul 1976, *Tracey* 14168 (BRI); Mt Webb, Starke Station, 15°03'S, 145°05'E, Sep 1974, *Tracey* 14407 (BRI); McIvor River Xing, Cooktown - Starke road, 15°07'S, 145°08'E, Jul 1976, *Tracey* 14428 (BRI); Dowlings Hill on Mt Amos road, S of Cooktown, 15°38'S, 145°18'E, Jun 1973, *Webb* & *Tracey* 11885 (BRI); Mt Stuckey area, inland from Starke Station,

14°56'S, 145°03'E, Sep 1974, *Webb & Tracey* 13807 (BRI); Lockerbie Scrub, 10°45'S, 142°30'E, *Webb & Tracey* 13808 (BRI); Between Starke & Hopevale, 15°12'S, 145°08'E, Sep 1974, *Webb & Tracey* 13809 (BRI).

***Distribution and habitat*:** *Mallotus resinosus* occurs in the Cook district of Queensland from Cape York south to the Annan River (Map 10) and is also widespread in Malesia (Airy Shaw 1971, 1976, 1981). Plants grow in notophyll or mesophyll semideciduous vineforest on substrates derived from granite or basalt.

***Phenology*:** Fertile collections are rare; plants flower from December to February and fruit several months later.

***Notes*:** There is no extant type material for this taxon and the representative specimen cited by Merrill (1918) may be considered a neotypification of the name (Balakrishnan & Chakrabarty 1991). Several other names were included in the synonymy of *Mallotus resinosus* by Balakrishnan & Chakrabarty (1991); however, I have not seen type material for these so bibliographic data is not included here. These authors considered that *Mallotus resinosus* is a polymorphic species with three varieties, with only the variety *resinosus* occurring in Australia.

In Australia *Mallotus resinosus* is superficially similar both to *Wetria australiensis* P.I.Forst. and *Alchornea rugosa* (Lour.) Muell.Arg.; however the two taxa may be easily distinguished by the alternate leaves, bifid styles and smooth fruit of the former (Forster 1994) and the foliage lacking sessile yellow glands of the latter.

***Conservation status*:** Widespread, not endangered or rare.

***Etymology*:** The specific name is derived from Latin and refers to *resin*. The application of this name remains obscure.

***Uses*:** None recorded.

**13. Mallotus surculosus** P.I.Forst., **sp. nov.** affinis *M. floribundo* (Blume) Muell.Arg. a qua in habitu frutice deciduo surculoso usque 3–5 mm alto, venis 8 vel 9 e basi radiantibus, stylis breviter connatis (0.5–1 mm) et partibus discretis brevioribus (2.5–3 mm), staminis paucioribus (18–20), et in fructu processis echinatis brevioribus (1–2.2 mm) differt. **Typus:** Queensland. Cook District: Shiptons Flat, 9 km from Lions Den Hotel, 15°46'S, 145°13'E, 10 Dec 1993, *P.I. Forster* PIF14420 (holo: BRI; iso: A, MEL, QRS).

*Mallotus* sp. aff. *mollissimus* #693 RFK; Hyland & Whiffin (1993).

*Mallotus* sp. (Claudie River P.I.Forster PIF135580; Forster & Henderson (1997).

***Illustration*:** Christophel & Hyland (1993: 109, t.47A)

Shrub to 5 m high, suckering profusely; seasonally deciduous, perennial, dioecious. Stems ± rounded towards apices, with sparse clear, simple or stellate hairs, glabrescent. Stipules lanceolate, 2.2–5 mm long, 0.8–1.3 mm wide, with sparse, clear stellate hairs. Leaves alternate, peltate, petiolate, discolorous; petioles 8–80 mm long, 1–1.3 mm diameter, with dense clear, simple, biseriate and/or stellate hairs and scattered yellow sessile glands; basilaminar glands 2 or 3 per side of midrib towards lamina base, ellipsoid to spherical, 0.7–0.8 mm long, 0.5–0.8 mm wide; lamina broadly-ovate to ovate, 20–130 mm long, 18–120 mm wide; palminerved, comprising 8–9 veins from the lamina base, 8–9 lateral veins per side of midrib and reticulate interlateral veins; upper surface matt grey-green, lateral veins barely visible, interlateral veins not visible, without granular inclusions, with sparse to dense, clear to ginger stellate hairs and scattered yellow sessile glands when young, becoming ± glabrescent with age; lower surface silver-green, lateral venation and interlateral venation well developed, with sparse to dense, clear to ginger simple, biseriate and/or stellate hairs and scattered to dense yellow sessile glands, indumentum persistent; tip short to long-acuminate; base rounded or truncate; margins weakly dentate with 16–20 small teeth to 1 mm long. Inflorescences racemose, up to 130 mm long, with sparse, clear simple, biseriate and/or stellate hairs and scattered yellow sessile glands; bracts triangular, 0.8–1.5 mm long, 0.7–1.2 mm wide, with dense, clear stellate

hairs. Male flowers 1–5 per bract; pedicels 1–2.5 mm long, c. 0.2 mm diameter, with dense clear stellate hairs; calyx 3- or 4-lobed, lobes lanceolate-ovate to obovate, 2–2.5 mm long, 1.3–1.6 mm long, with sparse to dense, clear stellate hairs; disk glands absent; stamens 18–20, free; filaments filiform, 1.3–1.8 mm long, c. 0.1 mm diameter, glabrous; anthers oblong, 0.7–0.8 mm long, 0.7–0.8 mm wide, glabrous or with an occasional simple hair, glandular cap absent. Female flowers 1 per bract; pedicels 1.2–5.5 mm long, 0.8–1 mm diameter, with dense, clear stellate hairs; calyx 4-lobed, lobes lanceolate, 3.5–4 mm long, 1–1.5 mm wide, with dense, clear stellate hairs; ovary 3-locular, subglobose, 1.8–2 mm long, 2.2–3 mm diameter, with scattered simple, biseriate and/or stellate hairs, scattered yellow sessile glands and dense echinate processes 1–1.2 mm long; styles 3(4), 2.5–3 mm long, connate at base for 0.5–1 mm, plumose with scattered simple hairs and scattered yellow sessile glands on backs. Fruits subglobose, 4.5–6 mm long, 7–9 mm diameter, with scattered simple, biseriate and/or stellate hairs, scattered yellow sessile glands and echinate processes 1–2.2 mm long. Seeds globose-ovoid, 3.8–4 mm long, 3–3.5 mm wide, 3.3–3.5 mm thick, tan-brown. Fig. 12.

***Specimens examined*: Queensland.** Cook District: West Claudie River Scrub, 12°44'S, 143°14'E, Jul 1993, *Forster* PIF13558 et al. (BRI); Massy Creek Crossing, Silver Plains, 13°55'S, 143°30'E, Jul 1993, *Forster* PIF13603 et al. (BRI, QRS); 3 km SSW of Rocky River Crossing, Silver Plains, 13°50'S, 143°27'E, Jul 1993, *Forster* PIF13646 et al. (BRI, QRS); West Claudie River, 12°45'S, 143°15'E, Jun 1972, *Hyland* 6188 (QRS); T.R. 14 Massy, 13°52'S, 143°25'E, Nov 1980, *Hyland* 10861 (QRS); Claudie River, 12°44'S, 143°14'E, Oct 1981, *Hyland* 11224 (QRS); Claudie River, 12°43'S, 143°16'E, Jan 1982, *Hyland* 11505 (QRS); T.R. 176 Monkhouse, Annan River, 15°45'S, 145°13'E, Sep 1982, *Hyland* 11997 (QRS); ditto, Oct 1982, *Hyland* 12163 (QRS); T.R. 176, Shipton L.A., 15°48'S, 145°14'E, Sep 1982, *Hyland* 12061 (QRS); S.F.R. 176, Parish of Monkhouse, 15°47'S, 145°16'E, Dec 1988, *Hyland* 13775 (BRI, QRS); Near Porn. 37V Parish of Monkhouse, 15°48'S, 145°14'E, Dec 1988, *Hyland* 13776 (QRS).

***Distribution and habitat*:** *Mallotus surculosus* is restricted to north-east Queensland from the Claudie River in the north to Shipton's Flat south of Cooktown (Map 6). Plants grow on alluvium or stony hillsides, always on the margins of notophyll or mesophyll vineforest. Plants sucker profusely and form dense monospecific thickets.

***Notes*:** *Mallotus surculosus* was first collected by Hyland in 1972; however, fertile material was not obtained until the late 1980's. The species is not mentioned by Airy Shaw (1981). Although labelled as "sp. aff. mollissimus" by Hyland & Whiffin (1993), *Mallotus surculosus* appears to be most closely related to *M. floribundus* (Blume) Muell.Arg. from New Guinea. *Mallotus surculosus* differs from *M. floribundus* in being a seasonally deciduous, suckering shrub, 3–5 m high; having 8 or 9 veins radiating from the leaf lamina base; the styles shortly connate (0.5–1 mm long) and the free parts shorter (2.5–3 mm long); fewer stamens (18–20); and shorter echinate processes on the fruit (1–2.2 mm long). *M. floribundus* is an evergreen, non-suckering tree, 7–13 m high, usually growing on the edge of freshwater swamps or streams and has 4–6 veins radiating from the leaf lamina base; the styles long-connate (1.5–3 mm) with the free parts longer (5–9 mm); more stamens (36–56); and longer echinate processes on the fruit (3–4 mm long).

***Phenology*:** Flowers December to January; fruits January to March. Plants flower when ± leafless. The fruit are shed before the foliage is fully expanded.

***Conservation status*:** Uncommon throughout its known range. Present in Iron Range National Park and Daintree National Park. Not considered rare or threatened.

***Etymology*:** The specific epithet is derived from the Latin *surculosus* (suckering) and alludes to the dense suckering habit of this species.

***Uses*:** None recorded.

**Excluded names and species**

**1. Mallotus tiliifolius** (Blume) Muell.Arg., Linnaea 34: 190 (1865); *Rottlera tiliifolia* Blume, Bidjr. 607 (1825). **Type:** Java. [ad littora insularum Nusae Kambangae et Javae], *Blume* s.n. (holo: BO).

***Notes*:** Airy Shaw (1981) applied this name to collections from Prince of Wales Island and Trinity Beach near Cairns. The former is a

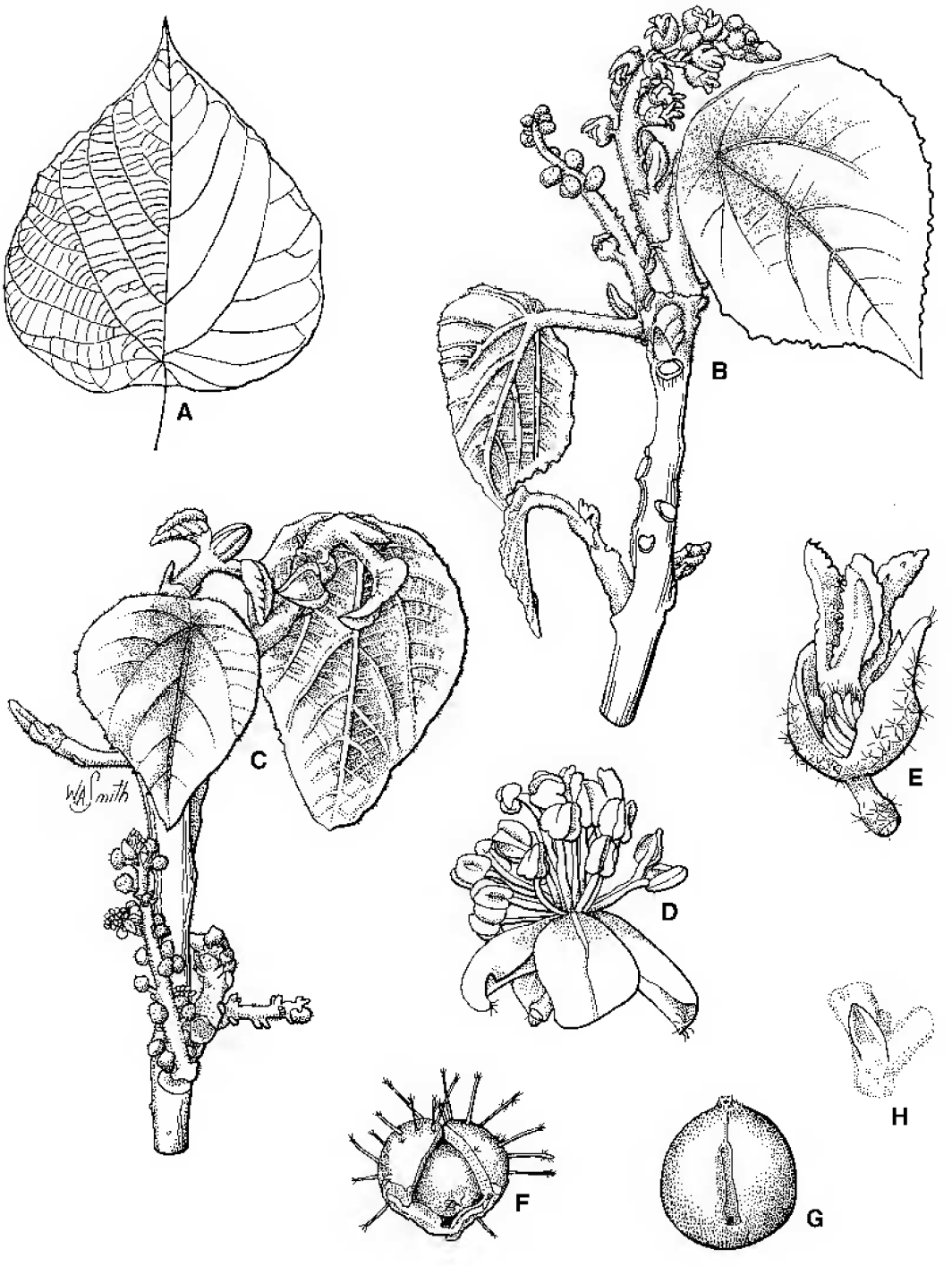



**Fig. 12.** ***Mallotus surculosus***. A. undersurface of mature leaf. x 0.5. B & C. flowering twigs with immature foliage. x 1.5. D. male flower. x 8. E. female flower. x 8. F. third of dehisced fruit showing stalked hairs. x 4. G. seed. x 8. H. internode showing stipule. x 2. A,B,D,E,H from *Forster* 14420 (BRI); C from *Forster* 16990 (BRI); F,G from *Hyland* 11505 (BRI). Del. W.Smith.

specimen of *Mallotus paniculatus* and the latter is a specimen of *M. nesophilus*. *Mallotus tiliifolius* does not occur in Australia.

I located a single sheet at BO that is probably the type of *R. tiliifolia*. This sheet bears a printed label that says "Java" and bears the name "Mallotus tiliifolius Muell.Arg." in Blume's handwriting. The specimen and label have been remounted, so there is no accompanying BO sheet number.

**2. Mallotus derbyensis** W.Fitzg., J. Roy. Soc. W. Aust. 3: 165 (1918).

***Notes*:** This name was referred to the synonymy of **Grewia breviflora** Benth. (Tiliaceae) by Airy Shaw (1981) and this remains unchanged (D. Halford, pers. comm. 1993).

**3. Mallotus oblongifolius** (Miq.) Muell.Arg., Linnaea 34: 187 (1865); *Rottlera oblongifolia* Miq., Fl. Ind. Bat.1(2: 396 (1859).

***Notes*:** Airy Shaw (1976, 1981) based his record of this species for Australia on a sterile specimen collected by *Berthoud* at the Johnstone River. This specimen (MEL69850) is *Macaranga inamoena* F.Muell.

**Acknowledgements**

W. Smith (BRI) provided the excellent figures. Field collections were made over what now seems a long time, with the assistance on occasion of A.R. Bean, L.H. Bird, G. Kenning, D. & I. Liddle, D. Orford, G. & N. Sankowsky, P.R. Sharpe, G. Smyrell and M.C. Tucker. Translation of the diagnoses into Latin was undertaken by L.A. Craven (CANB). Resolution of typification for the name *M. polyadenos* was made with the assistance of J.H.Ross (MEL). Access to State Forests and Timber Reserves in Queensland were facilitated by permits issued by the Queensland Forest Service. Photographs of type specimens at BM and K were arranged by P.S. Short (MEL) while Australian Botanical Liaison Officer at Kew (U.K.). Assistance with the visit to BO was ably provided by D.J. Liddle in February 1992. This work was a preferred objective of the Australian Biological Resources Study which funded the project during 1992-1994.

## References

Airy Shaw, H.K. (1966). Notes on Malaysian and other Asiatic Euphorbiaceae. *Kew Bulletin* 20: 25-49.

Airy Shaw, H.K. (1971). The Euphorbiaceae of Siam. *Kew Bulletin* 26: 191-363.

Airy Shaw, H.K. (1976). New or noteworthy Australian Euphorbiaceae. *Kew Bulletin* 31: 341-398.

Airy Shaw, H.K. (1980a). New or noteworthy Australian Euphorbiaceae - II. *Muelleria* 4: 207-241.

Airy Shaw, H.K. (1980b). An alphabetical check-list of native Australian Euphorbiaceae (excluding *Phyllanthus*, *Euphorbia*, and the Stenolobeae). *Muelleria* 4: 243-245.

Airy Shaw, H.K. (1980c). *The Euphorbiaceae of New Guinea*. Kew Bulletin Additional Series VIII. London: Her Majesty's Stationery Office.

Airy Shaw, H.K. (1981). A partial synopsis of the Euphorbiaceae - Platylobeae of Australia (excluding *Phyllanthus*, *Euphorbia* and *Calycopeplus*). *Kew Bulletin* 35: 577-700.

Bailey, F.M. (1891). *Botany: Contributions to Queensland flora*. *Botany Bulletin* 2: 18. Brisbane: Government Printer.

Baillon, H.E. (1866). Species Euphorbiacearum Euphorbiacées Australiennes. *Adansonia* 6: 282-345.

Balakrishnan, N.P. & Chakrabarty, T. (1991). *Mallotus resinosus* (Blanco) Merr. (Euphorbiaceae) and its allies. *Rheedea* 1: 36-39.

Barlow, B.A. & Hyland, B.P.M. (1988). *The origins of the flora of Australia's wet tropics*. Proceedings of the Ecological Society of Australia. 15: 1-17.

Bentham, G. (1873). *Euphorbiaceae. In Flora Australiensis* 6: 41-153. London: L. Reeve & Co.

Brock, J. (1988). *Top End Native Plants*. Darwin: J. Brock.

Christophel, D.C. & Hyland, B.P.M. (1993). *Leaf Atlas of Australian Tropical Rain Forest Trees*. Melbourne: CSIRO Publications.

Floyd, A.G. (1989). *Rainforest Trees of Mainland South-eastern Australia*. Melbourne/Sydney: Inkata Press.

Forster, P.I. (1994). *Wetria australiensis* sp. nov. (Euphorbiaceae), a new generic record for Australia. *Austrobaileya* 4: 139-143.

FORSTER, P.I. & HENDERSON, R.J.F. (1997). Euphorbiaceae. In R.J.F. Henderson (ed.), *Queensland Plants: Names and Distribution*, pp. 69-76. Brisbane: Department of Environment.

FORSTER, P.I., BOSTOCK, P.D., BIRD, L.H. & BEAN, A.R. (1991). *Vineforest Plant Atlas for South-east Queensland.* Brisbane: Queensland Herbarium.

GEISELER, E.F. (1807). *Crotonis Monographiam.* Halae: A. Grunerti.

HAUSER, J. (1992). *Fragments of Green*. Bardon: Rainforest Conservation Society Inc.

HEWSON, H. (1988). *Plant Indumentum. A Handbook of Terminology. Australian Flora & Fauna Series No. 9*. Canberra: Australian Government Publishing Service.

HUSSIN, K.H., WAHAB, B.A. & TEH, C.P. (1996). Comparative leaf anatomical studies of some *Mallotus* Lour. (Euphorbiaceae) species. *Botanical Journal of the Linnean Society* 122: 137-153.

HYLAND, B.P.M. & WHIFFIN T. (1993). *Australian Tropical Rain Forest Trees: An Interactive Identification System*. Melbourne: CSIRO Publications.

KENNEALLY, K.F., EDINGER, D.C. & WILLING, T. (1996). *Broome and Beyond. Plants and People of the Dampier Peninsula, Kimberley, Western Australia*. Como: Dept. of Conservation & Land Management.

MABBERLEY, D.J. (1989). *The Plant Book.* Cambridge: Cambridge University Press.

MERRILL, E.D. (1918). *Species Blancoanae*. Manila: Bureau of Printing.

MUELLER, F. (1858). Euphorbiaceae. *Fragmenta Phytographie Australiae* 1: 31-33. Melbourne: Government Printer.

MUELLER, F. (1864). Euphorbiaceae. *Fragmenta Phytographie Australiae* 4: 138-144. Melbourne: Government Printer.

MUELLER, J. (1865). Euphorbiaceae. Vorläufige Mittheilungen aus dem für De Candolle's Prodromus bestimmten Manuscript ber diese familie. *Linnaea* 34: 1-224.

MUELLER, J. (1866). Euphorbiaceae. In A.L.L.P. de Candolle (ed.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15(2): 189-1260. Paris: Masson.

WEBB, L.J. (1978). A general classification of Australian rainforests. *Australian Plants* 9: 349-363.

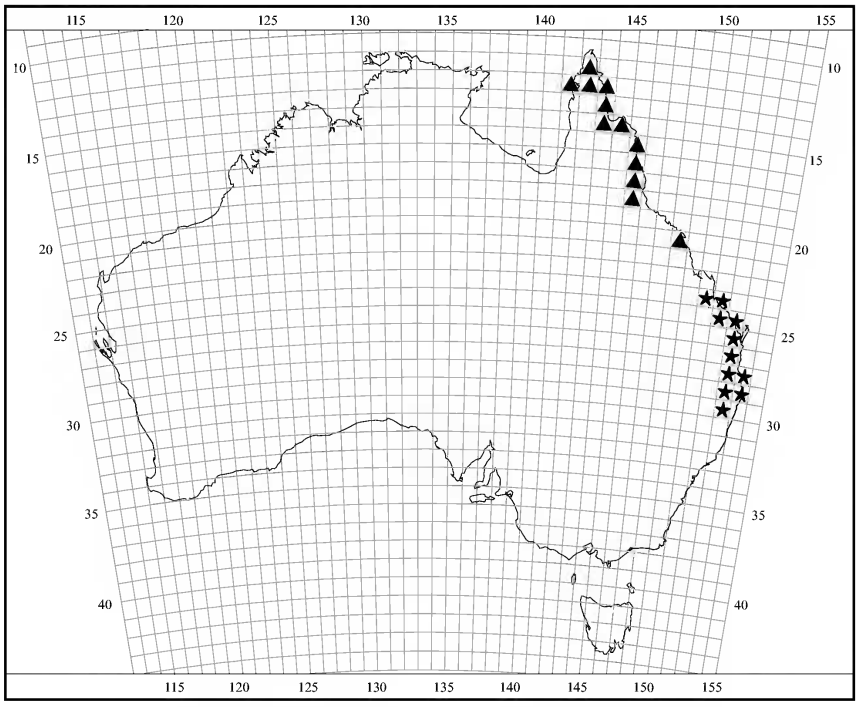
WEBB, L.J. & TRACEY, J.G. (1981). Australian rainforests: pattern and change. In A. Keast (ed), *Ecological Biogeography of Australia*. pp. 605-694. The Hague: W. Junk.

WEBSTER, G.L. (1994). Synopsis of the genera and suprageneric taxa of Euphorbiaceae. *Annals of the Missouri Botanical Garden* 81: 33-144.

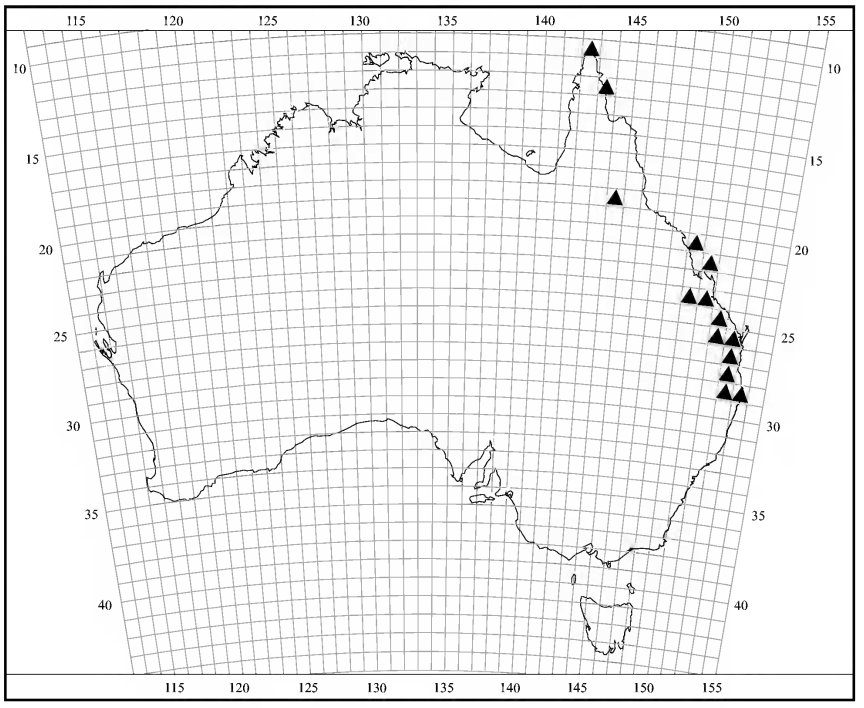
WILLIAMS, K.A.W. (1979). *Native Plants of Queensland. Vol.* 1. Ipswich: K.A.W. Williams.

WILLIAMS, K.A.W. (1984). *Native Plants of Queensland. Vol.* 2. Ispwich: K.A.W. Williams.

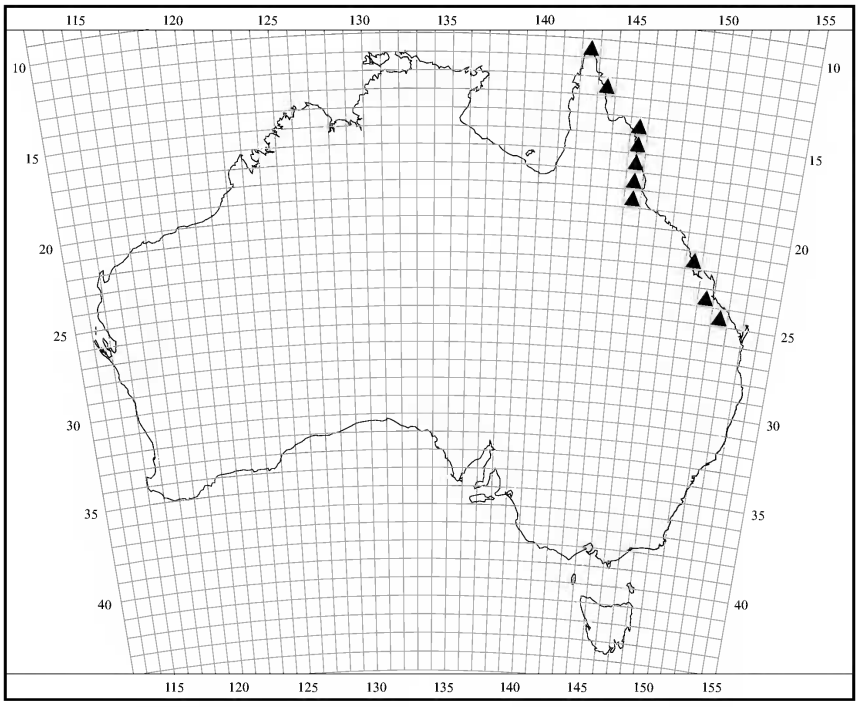
WILLIAMS, K.A.W. (1987). *Native Plants of Queensland. Vol.* 3. Ipswich: K.A.W. Williams.



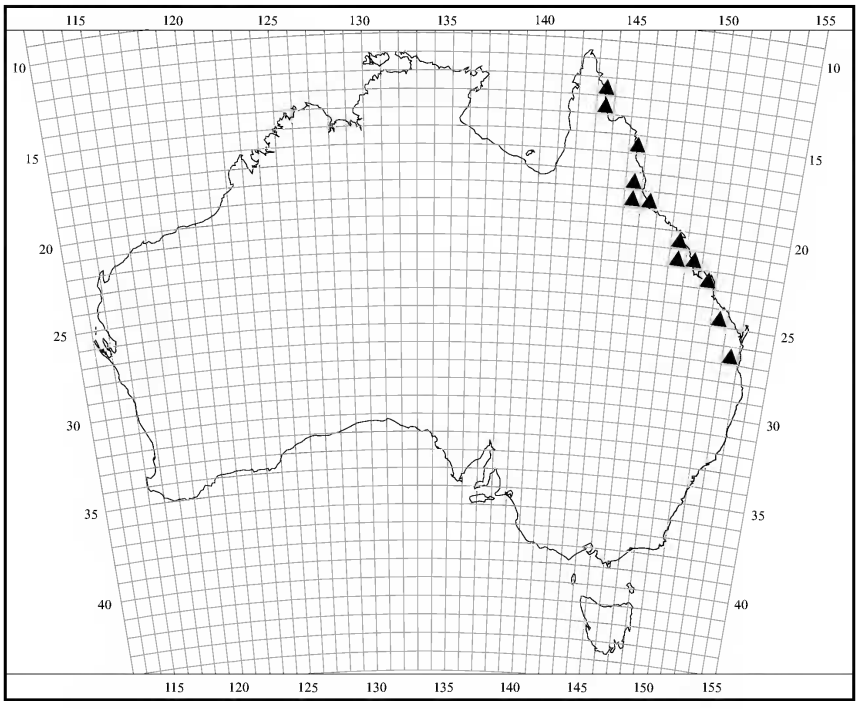

Map 2. Distribution of ★ *Mallotus discolor*, ▲ *Mallotus polyadenos*.



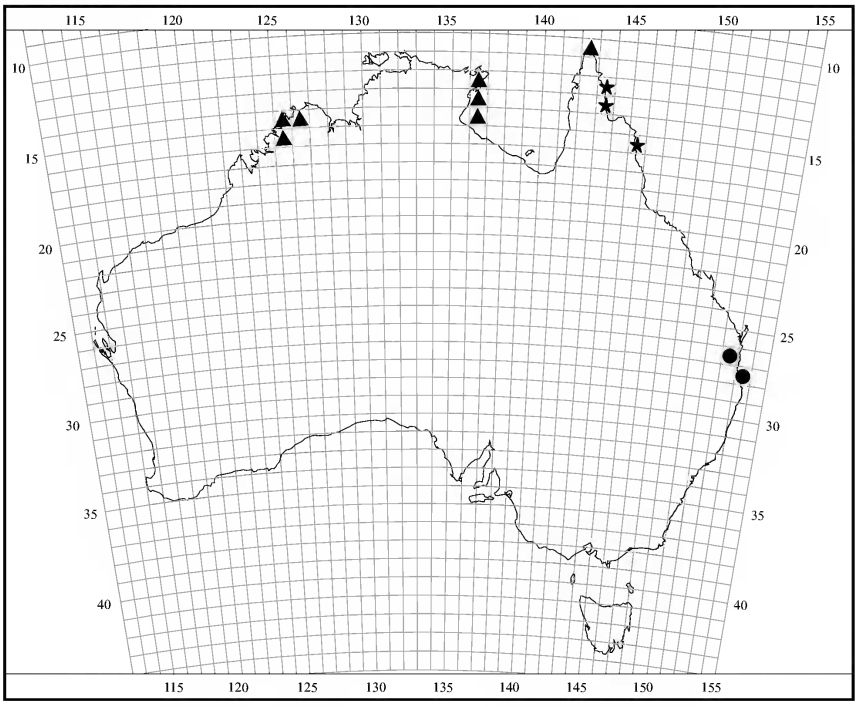

Map 3. Distribution of ▲ *Mallotus claoxyloides*.



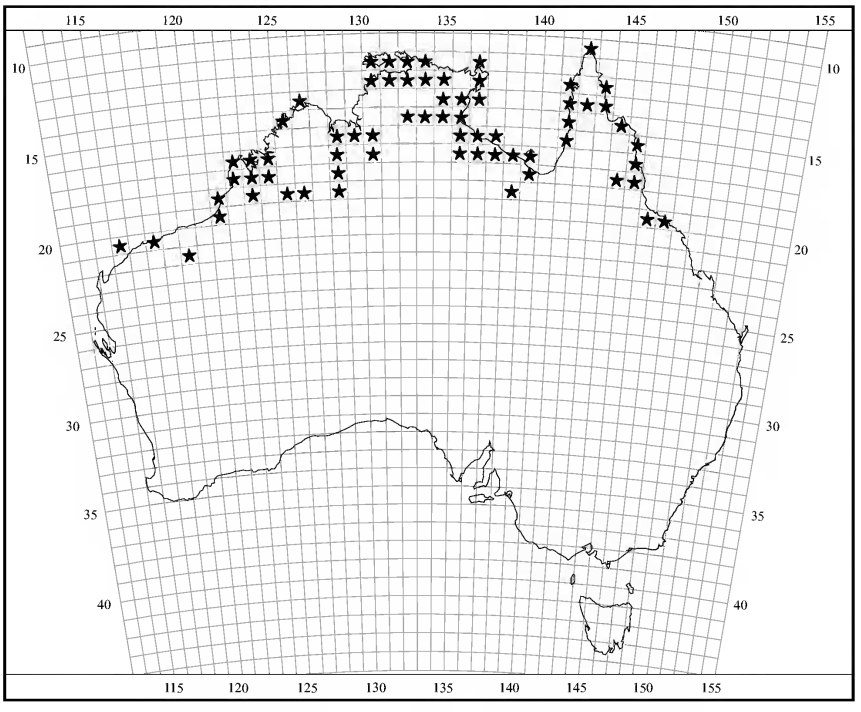

Map 4. Distribution of ▲ *Mallotus ficifolius*.



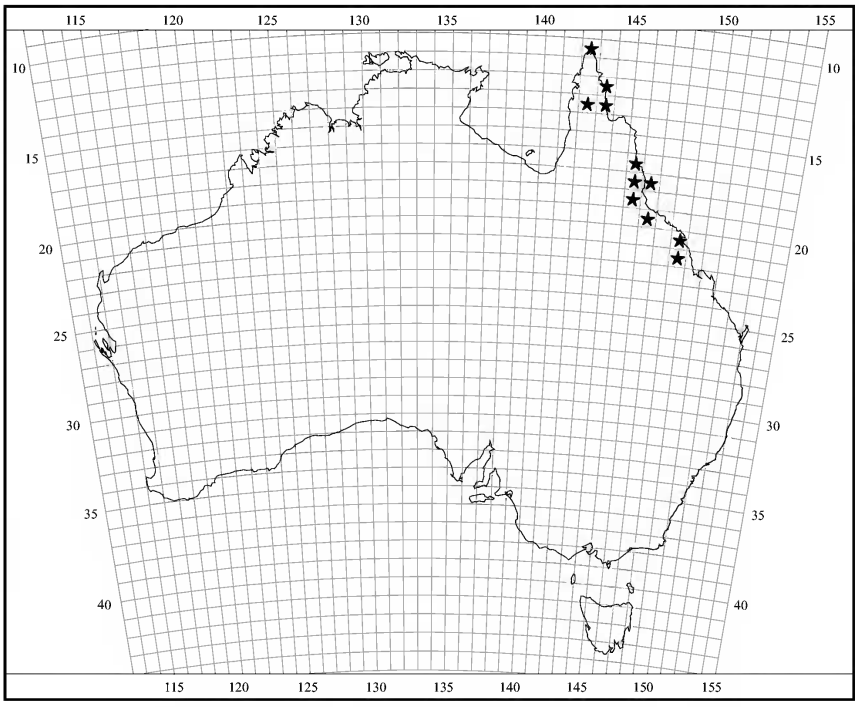

Map 5. Distribution of ▲ *Mallotus mollissimus.*



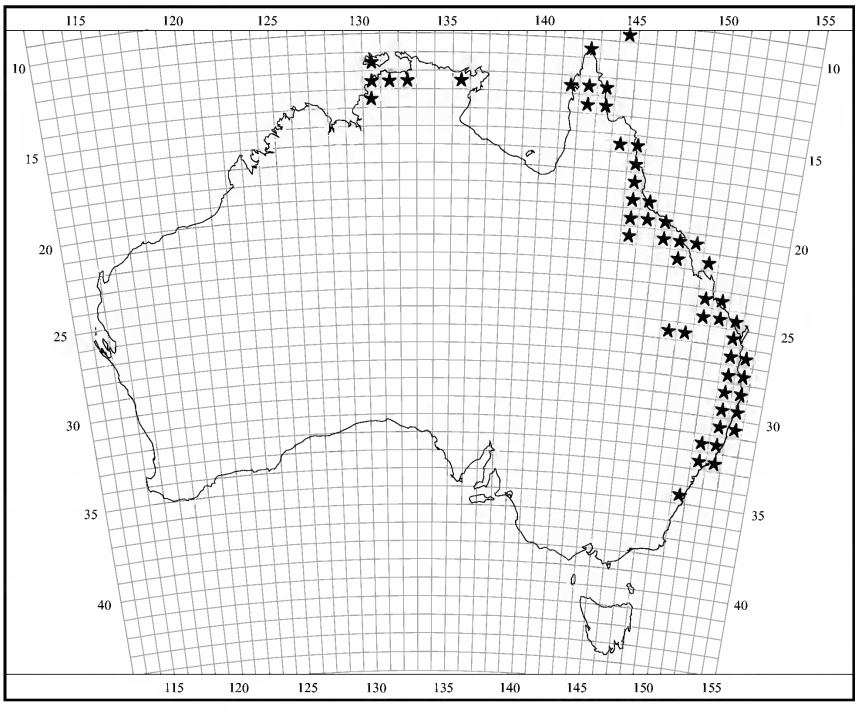

Map 6. Distribution of ▲ *Mallotus dispersus*, ★ *Mallotus surculosus*, ● *Mallotus megadontus*.



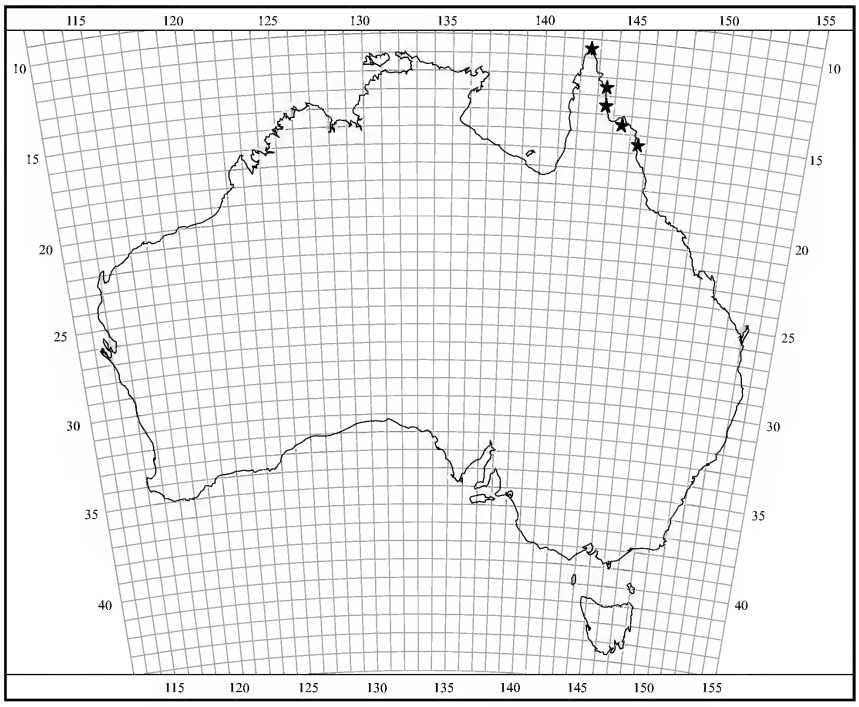

Map 7. Distribution of ★ *Mallotus nesophilus*.



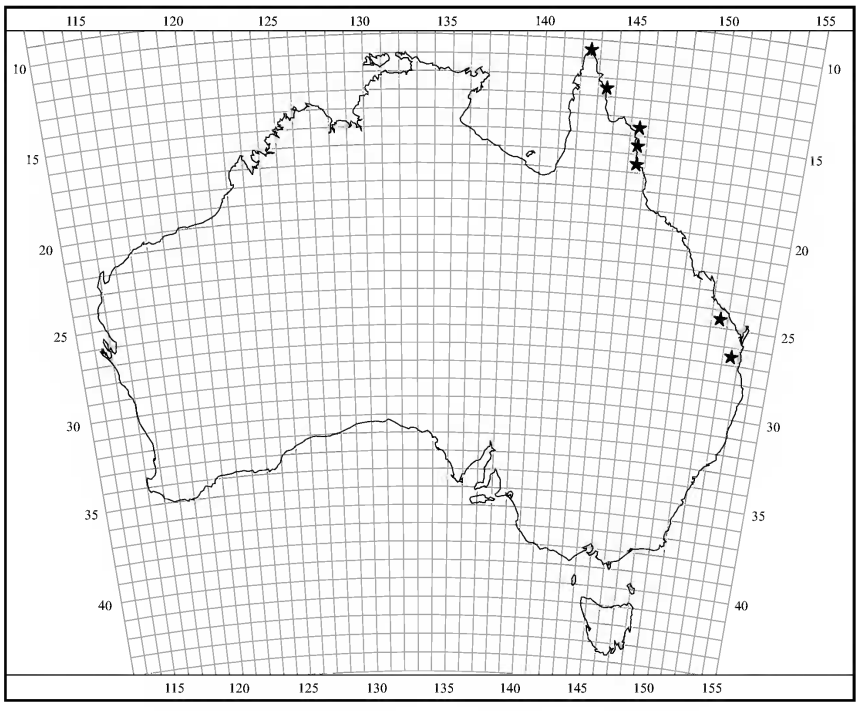

Map 8. Distribution of ★ *Mallotus paniculatus*.




Map 9. Distribution of ★ *Mallotus philippensis*.




Map 10. Distribution of ★ *Mallotus resinosus*.




Map 11. Distribution of ★ *Mallotus repandus*.